DOCUMENT RESUME

ED 190 117 IR 008 602

TITLE Annual Conference of the Public Service Satellite Consortium (4th, Washington, D.C., October 11-12, 1979).
INSTITUTION Public Service Satellite Consortium, Washington, D.C.
PUB DATE Oct 79
NOTE 191p.

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS *Cable Television; *Communications Satellites; Delivery Systems; Public Policy; *Public Television; *Satellites (Aerospace); State of the Art Reviews; *Telecommunications

ABSTRACT

This collection of papers delivered at the conference provides information on the current state of communications satellite applications and technology, the relationship of cable television and satellites, the role of satellites in public broadcasting, and the future of satellites in serving the needs of the public. Remarks and addresses by the following people are included: Harry M. Shooshan, Chief Counsel, House Subcommittee on Communications; Andrew F. Inglis, President, RCA American Communications; James Ragan, Vice President, Western Union; Joseph N. Pelton, Executive Assistant to the Director General, INTELSAT; Neil R. Helm, Marketing Director, Systems Technology Services, COMSAT; Robben W. Fleming, President, Corporation for Public Broadcasting; Elizabeth Young, President, Public Service Satellite Consortium; William Lucas, Associate Administrator, National Telecommunications and Information Administration; Donald Dement, Manager, Advanced Communications, NASA; and Thomas E. Wheeler, President, National Cable Television Association. Questions and answers involving the audience and the speakers are also included. (FM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED190117

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

FOURTH ANNUAL CONFERENCE

PUBLIC SERVICE SATELLITE CONSORTIUM

October 11-12, 1979

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Polly R. Rash

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

IR008602

Welcome
By

Dr. Elizabeth Young
President
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

We thought that might be a nice mood-setting piece to start off our meeting together to remind all of us of how many unexplored worlds there are left for us and how much adventure there is to look forward to.

Good morning, and welcome to the Fourth Annual Conference on Satellite Communications for Public Service. I'm Elizabeth Young, President of PSSC, and this will be the first conference and membership meeting over which I will have the pleasure of presiding.

The Board of PSSC and the staff join me in bidding you welcome today. As of this week, the Public Service Satellite Consortium has 107 member organizations. Many of those organizations are represented here this week, and we know many of you well and hope to become acquainted with many more of you as these two days progress.

I would now like to introduce to you the Chairman of the PSSC Board and former Governor of American Samoa, H. Rex Lee. Governor Lee has had a distinguished career in government and public service and many of you also knew him as Commissioner of the FCC.

It's been my privilege to work closely with Rex, not only during the three years I served on the Board of PSSC, but during my past four months as President. I will now turn over the podium to Rex who will introduce our keynote speaker this morning.

528

Remarks
By

H. Rex Lee
Chairman of the Board
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Dr. Young. Ladies and gentlemen, I add my welcome to that of Dr. Young. We're certainly pleased to have such a distinguished group of people here who are interested in using advanced communications to improve public service. We hope that you have a very enjoyable and rewarding two days. I'm sure that you will.

Those of you that were with us last year recall that the day before our opening session, the President preempted our keynote speaker, Secretary Cecil Andrus. We couldn't argue much with that preemption. Unfortunately, it's happened to us again. I'm sure that many of you were looking forward to hearing Congressman Van Deerlin, and that you were enthusiastically waiting for him to address you this morning. Congressman Van Deerlin, of course, has taken a very special interest in PSSC since its very inception some four and a half years ago in its organization in San Diego. You will recall that he was the keynote speaker at our initial annual conference. He gave a very interesting and rewarding talk on communications, and so we were very delighted when he agreed to be our keynote speaker again this year. We thought it would be very appropriate to have him bring us up to date on what was happening in the field of communications.

Fortunately, Congressman Van Deerlin gave us some good help. He persuaded or helped us persuade the Chief Counsel of the House Subcommittee to come and convey his thoughts and also to contribute his own independent thoughts on what was going on in the field of communications.

There probably is no one in Washington that knows better what is going in the field of communications than Chip Shooshan. He has been Chief Counsel and Staff Director since 1974 of the House Subcommittee on Communications. Prior to that time, he was, I think, Administrative Assistant to that same staff for about five years. He's a graduate of Harvard and a graduate of Georgetown Law School.

I've known Chip for a good many of those years, watched him operate, and I'd have to say that we are indeed fortunate to have him with us this morning. Chip, we are especially appreciative of your being willing to come on such short notice and to address this group this morning.

Keynote Address
By

Harry M. Shooshan, III
Chief Counsel
House Subcommittee on Communications

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Rex, very much, and Liz. It's tough following the two of them, but it's certainly tough for all of us following that movie. I have no visual effects or graphics or anything to bring with me today. I do bring with me the greetings and welcome to Washington. I wish that Chairman Van Deerlin could have been here to extend them himself, but when you're riding on the world's largest non-scheduled airline, Air Force One, and they tell you it's ready to leave, you leave.

Van is today in Albuquerque and will be leaving shortly with the President for San Diego. You can imagine when the President called him and asked him to join him, it was somewhat embarrassing in one sense, because usually when the President travels to a state, he's greeted by the Governor of the state. In this case, I think we can expect why the Governor would not have been there to greet the President. He also is generally greeted by, at least, the Democratic Senator from that state, and Senator Cranston, I believe, if you read the paper has been less than charitable in some of his assessments of President Carter in recent weeks, and so it got down to where the President felt it would just be great if Mr. Van Deerlin could be there in his home city to arrive with the President.

There were two inducements for Mr. Van Deerlin to make the trip. One, both the President and Mr. Van Deerlin are inveterate joggers. I think, Van, however has finished every race that he has started, and they wanted to talk about jogging, and, secondly, the President said, and this was a real inducement, he said, "I want to talk to you about this new communications legislation that you've been working on," and as I'll allude to later, I think the interest of the White House now and the Administration in this project is going to be very useful and important.

So, again, a long-winded way of saying our apologies that the Chairman could not be with you today, but I will, as Rex indicated, stick pretty close to the text of the remarks that he would have given and had prepared to give today to you.

First, let me say that I think you are, indeed, fortunate. I don't know Liz that well, but I've heard good things about her. I know one thing for darned sure, and

that is you're certainly lucky to have Rex as your Chairman. He has been the driving force, I think, more than anything else behind putting this organization together, and it's not just simply comedy when I say that we have a great deal of respect for him and the work he's done, both when he was on the Commission and here at PSSC.

One way you can tell that satellite communications has arrived was mentioned to me the other day, and I don't know whether any of you in the room have seen the new 1980 Neiman-Marcus Catalogue. I don't get it; I'm not on their mailing list, but somebody called this to my attention, that the first gift in the 1980 Christmas Catalogue is a satellite earth station. Now I had this read to me over the phone, and I took some notes. This is basically what the little ad in the Neiman-Marcus Christmas magazine says. It says, "Do you choose your television programs, or do you settle for what's available in your area? Now you can pull the world to your doorstep with the first remote-controlled, multi-satellite antenna manufactured by Scientific Atlanta. Options include over 2000 sports events yearly, 6000 hours of special children's programming, 10,000 top movies, live nightclub shows, sessions of the U.S. House of Representatives, direct line to news agencies and business reports, new superstations, and much more."

Now, of course, the prices of all these Christmas gifts in the Neiman-Marcus Catalogue are modest. This comes to you for the unbelievably low price of $36,500, but that includes shipping and installation, preparation for FCC license and an authorization form from program distributors including the first year of fees. It's available only through Neiman-Marcus until February 1980, so you can all rush out and order yours.

I think what's significant though is the fact that, you know, this may appear now in the Neiman-Marcus Catalogue as some kind of camp gift that the very wealthy can give their friends that have everything, but I don't think it's too much beyond belief or imagination to think that within the next decade, we may see such an earth station, not in the Neiman-Marcus Catalogue, but in the Sears or Montgomery Wards catalogue, because I think that is the direction that the new technology and the development of technology is taking us in this country.

The House Communications Subcommittee shares the enthusiasm that, I know, all of you have here in this room for new technologies. We were in a modest way a pioneer, the first committee to conduct a congressional hearing with the help of satellites. That took place in 1976 when Don Williams of Mission Cable Television in San Diego delivered his testimony to the committee via satellite. What was unique in 1976 is more commonplace today. The House of Representatives itself is wired from top to bottom with floor proceedings televised to members' offices and sent via satellite to more than five million cable TV subscribers across the country.

I understand that later today at the Washington Press Club, Ted Turner, the owner of the superstation in Atlanta is going to be announcing more details of his 24-hour news service to be fed from points all over the world via satellite to cable systems all over the country.

You've succeeded by one day the National Radio Broadcasters Conference which was using this hotel, and one of the booths set up here...I was over Tuesday...was Mutual Radio, and, of course, they are using satellite interconnection for their affiliated radio stations.

Satellite transmissions to broadcast stations and to cable TV systems are becoming part of the day-to-day reality for more and more of us. Who would have predicted any of this back in 1962 when Congress passed the Communications Satellite Act, the law creating this country's first communications satellite. Our technicians didn't imagine the possibilities. Some of the best engineers at Bell Labs, for example, were envisioning just a small niche for new technology. Three pairs of single-channel, high altitude satellites transmitting their signals to a mere 28 ground stations would do they trick, they thought. Today there are more than 1500 receive-only earth stations in operation. Up to 2200 of these stations could be in use by the end of the year according to the best estimates. SBS, that quarter billion dollar data voice and video satellite system assembled by IBM, a similar system established by Xerox, the X-Ten system, will soon link offices around the country, and, in time, around the world. Meanwhile the Aerospace Corporation is developing a satellite receiver no bigger than that wrist radio that Dick Tracy used to wear in the comic strips.

The Japanese BSE experiment in direct satellite to home broadcasting is about to be matched by an American venture. This summer, COMSAT, that same upstart company chartered by Congress in 1962, announced preliminary plans to launch its own direct satellite-to-home broadcasting service. For approximately $20 per month, COMSAT estimates they can install a two-meter receiving dish on your roof and provide you with six channels of television programming too. Hopefully, I might add, the FCC will not impose regulatory barriers to hold back this new undertaking.

Satellites can save money. That's something, I think, all of you are aware of. ITT, for example, will soon offer city call, a satellite microwave network that will provide long distance telephone service at rates up to 85 percent below those charged by Ma Bell. Satellites have made their mark, as you know better than I, in the public service sector. The ATS-6 experiments are history, proof that new technology can improve health care, instruction in cultural services, in the most remote parts of the world...Alaska, Canada, India, Asia, Africa and Latin America.

Now, although satellites have exceeded the expectations of the early 1960's, they've delivered new services and cost savings too. Cost continues to be an important factor in any discussion of new technology, and cost is an especially critical factor for those of you in public service, those of you in organizations that are struggling to maintain old programs in a new climate of fiscal restraint prompted by Proposition 13. Some of the factors contributing to high costs are obvious. Others, however, are almost hidden, or, in any event, less obvious.

Government regulation, for example, can take a share of the blame as can the failure of funding agencies and satellite users to share information and coordinate efforts.

Regulation these days in Washington and elsewhere is a fashionable scapegoat, the often-cited evil causing every ill that assails us according to some, but in at least one area, I'm certain, communications technology, the critics of excessive and expensive regulation have a point. Communications satellites, whether they are used to transmit long distance calls to the world's most profitable corporations or to beam continuing education courses to rural physicians, must be regulated. It's the law. The law in question is the Communications Act of 1934, passed, as the date would indicate, when satellites were just a dream of engineers and science fiction buffs.

The regulators involved are members and staff of the Federal Communications Commission, a body charged with protecting, quote, "the public interest, convenience and necessity," end quote. On a practical level, this means, as Andy Inglis and others can tell you, that any corporation that wants to launch and operate a satellite must obtain permission from the FCC to start, to expand,cut-back or withdraw service. Tariff filings are mandatory and subject to FCC approval. Also, each firm must make sure that its equipment complies with technical standards set by the Commission. So far, so good, but what does this regulation accomplish?

First, established companies with millions of dollars riding on every FCC decision make sure they are well represented in Washington. New firms and members of the public have a much tougher time getting the FCC's attention, and regulatory protectionism is often the result. Moreover, the FCC control over market entry often discourages corporate investments necessary to develop new technology. In fact, there are some that argue that the FCC has stunted technological progress and kept prices artificially high.

Let me give you a few examples. Shortly after COMSAT was in working order, the Associated Press, United Press International, Eastern Airlines and several other companies wanted to lease channel space figuring that the satellite which is insensitive to distance, as you all know, could provide cheaper transmission than AT&T's undersea cable. COMSAT, for its part, was ready and willing to go, but the Commission wasn't. It ruled that COMSAT could sell directly only to establish carriers like AT&T which could then resell the channel capacity at rates which were just about comparable to those charged for undersea cable.

Example number two...as early as 1972, engineers knew how to produce satellites and small five-meter receiving dishes that were substantially cheaper than the FCC-required ten-meter dishes which were selling for $30-40,000. Yet, it was not until December of 1976 under pressure from the House Communications Subcommittee that the FCC relaxed its rules. Hopefully, before this year is out, the Commission will eliminate those regulations altogether.

Now, to be fair to the FCC and spread responsibility around here, the Commissioners have not always received much help from those fellows that pass the laws which

agencies are to administer. Congress has left the FCC struggling with an outdated law, and we are all paying the price. Without legislative guidance, the Commission is left to do the best job it can, ignorant of congressional intentions and the priorities that should inform and shape a national telecommunications policy.

Unfortunately, the FCC isn't the only organization fighting ignorance. A failure to share information, coordinate efforts and cooperate with other institutions plague not only the federal government, but private users of satellites as well. At just the federal level, for example, 18 different agencies use or fund programs which use satellites for public service purposes. Until recently, each of these agencies was working alone failing to share information or coordinate efforts on all but the most informal and ad hoc basis. The administrator, educator or health care professional who wants to use a satellite for the first time faces a task and challenge that the most ambitious bibliographer or abstracter would face. The information about social service applications in satellite technology is scattered in academic and professional journals, government reports, think tank studies, newspaper articles and trade magazines.

In short, there is no clearinghouse for information, no method for insuring that we learn from one another's successes and from failures. The absence of information can lead to serious, persistent and expensive consequences. Too often, the unsophisticated user might choose a high priced, broadband video link, when a cheaper narrow band audio transmission could do the job just as well and at a lot lower cost.

Ignorance creeps down into the institution too, where your colleagues who may be skeptical of new-fangled technology fail to adjust their lecture, speech or demonstration to the constraints of the television camera or an audio system. In short, information, a complete orientation to technology is necessary.

Now, cooperation can be another stumbling block. A professor of communications at the University of Southern California who evaluated the ATS-6 experiment noted that the failure of HEW, NASA and the satellite users to plan effectively, prevented the use of narrowband interactive facilities. Harold Morse, Director of the Appalchian Educational Satellite Program, pointed to a lack of cooperation from public broadcasting when he testified this spring before the House Communications Subcommittee. As he put it, quote, "Simply requesting accessibility to programming already paid for by public funds has been met by technical bureaucractic gobbledy-gook concerning basically the copyright restrictions of this material. The government has an obligation to correct situations like these in an effort to lower costs for public service users," and I'm pleased to report that something is being done on all of these fronts.

The National Telecommunications and Information Administration, a branch of the Commerce Department charged with advising the President on telecommunications policy, has tracked down those 18 federal agencies using or funding public service satellites,

formed a committee and launched a series of regular meetings to pool and exchange and evaluate information. NTIA is also finishing a summary report on interactive technologies, a non-technical wrap-up of the pros and cons, special features and average costs of everything from computer and teleconferencing to two-way cable television.

Social service users of satellites are often small users of satellites who can't afford the steep rates charged by RCA, AT&T and other large commercial operators. To crack this problem, NTIA is proposing that non-profit brokers identify small users and purchase time for them as a block.

An RFA for prospective brokers will be going out soon from NTIA. HEW, a long-time funder of telecommunications projects for social service delivery, is aware of the information gap problem among users and may launch its own effort to establish a clearinghouse. That would be a welcome development, and conferences, like the one today, the one you're having this week, are important steps in the right direction. Meanwhile, back on Capitol Hill, the House Subcommittee has been working for three years now on a project called the rewrite. The rewrite is a shorthand term for extensive revision of the Communications Act of 1934, that outdated law that I referred to which requires the FCC to regulate every communications technology that comes down the pike. So far, the House Subcommittee has heard from more than 1200 witnesses during 95 days of hearings. There are currently three bills before the Congress, one in the House and two in the Senate, which advocate many of the same measures... less regulation, more competition, and a free open marketplace where consumers can choose the product or service that suits them.

Just a few weeks ago, as I mentioned earlier, we received an important boost from President Carter who issued a message calling for less regulation and more competition in the communications industry and supporting the thrust of the bills pending in the Congress. If Congress acts to respond to the call, the FCC will finally receive some long needed legislative guidance. Expanded competition could and should hasten the technological advances that would bring you more services at lower rates, but communications reform is a long and difficult process. If you're interested in satellites you have to keep informed of all of these things I've been talking about today.

Share information with one another, cooperate on projects of mutual concern, and keep at least one eye part of the time on Washington. Follow FCC proceedings, and write your congressman whenever you discover federal regulations that are keeping you from offering services you could offer. Members of Congress do read their mail, believe me.

Thank you, and thanks again for the opportunity to be with you this morning.

Questions and Answers
By

Harry M. Shooshan, III
Chief Counsel
House Subcommittee on Communications

Fourth Annual Conference
Public Service Satellite Consortium

GOVERNOR LEE: Thank you, Chip, for that very wonderful review of where we've been, where we are now, and where we might be going, some of the problems and also some of the hopes. I'm sure this group is, in spite of all the problems we face in accomplishing some of the things that need to be accomplished, I'm sure the group is hopeful that things are moving ahead to improve the chances for better communications, better public service and so on.

I hope that now the Congressman will continue his efforts as he has in the past. I hope you will convey to him also our deep appreciation for the very wonderful help that, I think, he has given the public service community in his work on Capitol Hill, and the fact that there are discouragements, I hope will not keep the Congressman and his subcommittee from forging ahead.

Now Chip has graciously agreed to field questions from the floor. This is an unusual opportunity for you to really ask some of the questions that might be bothering you, and we do have a substantial period of time for this activity which, I think, is a wonderful opportunity for you, so don't be bashful.

AUDIENCE: Would you kindly elaborate a little bit on where you talked about Harold Morse and the problems with copyright and the problems with public restrictions?

MR. SHOOSHAN: Yes, the concern he was expressing was that there was a lot of good programming that had been developed for public broadcasting use that had been underwritten, at least in part, with government funds that was not available, because, in some way, the rights to those programs had been tied up in excruciatingly complex arrangements within the Corporation for Public Broadcasting,(PBS),or the member stations, and his suggestion was, you know, it's very difficult for me dealing as I am with an ongoing project to fight my way through this maze of complexity, and he was suggesting to us that in considering increased and further funding for public broadcasting that we might want to deal with this situation, we might want to create a situation, if we can, where the rights to these programs would be generally available for non-profit use by a whole host of people, and I think that's desirable.

AUDIENCE: I thought you said you were encouraged by this. Where is the encouragement coming from?

MR. SHOOSHAN: That I was encouraged by that? No. Maybe —

AUDIENCE: Encouraged by the present situation that things are going to happen.

MR. SHOOSHAN: Okay. Sure. I mean, we are looking at that problem. We've had discussions with people at CPB and PBS about trying to eliminate that problem, and, I guess, we were discouraged to learn of it and discouraged to hear of his problems, but we're encouraged that some progress can be made, but I can't report to you specifically what's being done on that except that we are following through on that point that he raised with us.

AUDIENCE: The question of copyright is not gobbledy-gook. It's a whole body of law and encompasses something that's been going on for years and years and years. It's not just public broadcasting. Independent producers and anybody else protects their work, and there's a body of law dating back. For instance, an independent producer, he has the Constitutional right, I guess, to protect himself, and if the Congress can find to do it, the broadcasters would love it too. From Harold's standpoint, to say that it would be open and available to him or should be just because someone went into it, it's really an oversimplification, and I wish it could be that way, and maybe someday it will. I hope somebody got a chance to talk about it. Public broadcasters all across the country are having meetings, spending a lot of time, a lot of money to try to get this copyright thing as good as it can be, but as far as the congressman's interest and the meetings that I've been in, he is one of the most knowledgeable persons in this area that we've found, and we hope that when a knotty question like that comes up and a view of it, that it will go in-depth, and we have come to the conclusion that helps to solve it, and I agree where more appropriately more money should be put into than your tax money and mine. We should do that, and so my question to you is, did somebody get a chance to rebut that?

MR. SHOOSHAN: Well, I think it's not a question of rebutting it. I think we're well aware of the Copyright Act, the 1909 Act, and the 1976 Amendments to it. What I'm saying is that I think that Mr. Morse was reflecting a valid concern when he said that I'm not a copyright expert, all I know is the government is funding public broadcasting to an ever-increasing amount of money, and maybe there ought to be some way, and you find out for me, Mr. Congressman, how that money that is being used to support programming for non-profit use in public broadcasting can be made available to broader audiences through different programs. So we are looking at that, not just in the superficial thing, but on the question of the retention of rights by CPB to programming funds, what the ramifications of that are, and I hope that we can cut through some of that gordian knot before we're through.

AUDIENCE: Yes, in talking about the public contribution, of course, there's a huge public contribution to the state program for satellites, and I'd like to know what the Congressman and the Subcommittee are...how they've reacted to the proposals that were made that they reserve some space, some transponder space as they have in broadcasting for non-commercial users.

MR. SHOOSHAN: I think that suggestion was taken very seriously, not only because you made it, but because it does raise a legitimate question. I can't, again, tell you anything specific that is being thought about on that except that that is an option we want to look at. I think that by the same token, we want to be able to take steps in a larger context to bring down the costs of satellite communications for everyone, and I think that the applications for public service use will, therefore, be expanded, but that proposal is something that certainly is actively under consideration as far as we're concerned, and I would hope as far as the FCC was concerned too. Yes, sir?

AUDIENCE: Another approach or option somewhat comparable to that is the continuing R&D and NASA public service satellites, and, as you know, Congress introduced a bill last year to provide funding and continuing R&D in that area. As far as I know, that bill has not been reintroduced in the current session. Is the Subcommittee interested in and possibly looking for some comparable kind of bill that might get us back into public interest satellites through research and development?

MR. SHOOSHAN: I can't answer specifically again in terms of whether we're looking at that kind of bill. In fact, I think it might not even fall within our jurisdiction, but probably the Science and Technology Committee which has NASA oversight. I do know that we've had a lot of contact with that committee, and that Mr. Van Deerlin has said on a number of occasions how highly he thinks of the R&D work that had been funded in the past by NASA. I think that the imporcance of having NASA continue to look at ways in which satellite communications can be developed and having an R&D program is useful and has produced tangible benefits; so, again, generally, I think, we would be supportive of that continuing effort.

I would add one thing, and that is that one of the problems, I think I've seen in the past with R&D programs, is that...especially pilot programs...is that there needs to be a greater effort to integrate the results of those programs into sort of the real world problems that exist and to make better provision for the maintenance of those programs, once the federal money, whether it's coming from NASA or coming from NTIA or any federal source or foundation, once those funds are removed, that there has to be better coordination and better effort to provide some ongoing benefits of those programs. We're aware of what NASA is doing. We think very highly of what NASA is doing and feel that it is extremely appropriate, I mean I would say, and I think Mr. Van Deerlin would say to continue to underwrite R&D using satellite communications through the auspices of NASA or NTIA if we can do it that way. That's something we have direct jurisdiction over.

AUDIENCE: I'm intrigued by the Neiman-Marcus ad for a dish.

MR. SHOOSHAN: So was I.

AUDIENCE: And if a school or an institution wanted to install one of those dishes, number one, would it have to face some kind of regulation first, and, B, would every television set in the institution have to have some adjustment, or would it be receivable through the existing distribution system within the institution?

MR. SHOOSHAN: Okay. As Rex indicated when he introduced me, I'm a lawyer, not an engineer, so we have one on the staff that could answer that question directly for you.

The current FCC rules would require that dish to be licensed with the Commission and to meet technical standards established by the Commission which Neiman-Marcus is willing to include at that unbelievable low price of $36,000. It also occurred to me that maybe this was one of those old ten-meter dishes that people are trying to unload at this point in time. It would be my understanding that there would be some cost associated and paperwork with licensing this dish with the Commission, and I don't believe that you'd need any internal adaptations of a school system's television. It can feed through, much as you do today, through a master antenna or cable head end.

AUDIENCE: Would you tell us as specifically as possible what the status of the communications legislation is in the House, and, if you know, the Senate?

MR. SHOOSHAN: Well, okay, I'll tell you as specifically as I can, and that is that it is an ongoing effort contrary to reports in the press and other places that somehow the effort to reform the laws is dead. I don't think that's the case. I think it's resting at this point right now. We're in an interlude. Certainly on the House side, I think we've found that the vast majority of the House members, House Subcommittee members on both the Democratic and Republican side, are anxious to go ahead with legislation, but not in the omnibus fashion that the chairman and Congressman Broyhill proposed, that is that they would like to break off and deal with what are felt to be the more serious and important and pressing areas, particularly domestic common carrier initially, and then return at some point later, either in separate legislation or by piecemeal amendments to other aspects of reform and change. That is also the thrust of the President's message which is to get on with the process of reforming the common carrier section of the Act and return at some other time to areas like broadcasting, public broadcasting, FCC reform.

We are hopeful, you know, that there will be progress in the House within this Congress. As far as the Senate is concerned, I really can't speak to that situation except to say that I think there's a serious effort there also being made to enact some legislation, but the timing right now is uncertain. When you've got energy

problems, budget resolutions, payraises for House members, and other important matters pending, sometimes issues like communications, which are very complex, technical and have only indirect impacts on society, tend to get pushed aside, but I think we'll use this opportunity that we have that to get some legislative change before it's through. Yes, sir?

AUDIENCE: What is the status of the common carrier bill?

MR. SHOOSHAN: The status of the common carrier bill is that there are a number of sort of options floating around right now. I think as far as Mr. Van Deerlin is concerned, he feels basically that the provisions of H.R. 3333 dealing with common carrier, domestic common carrier, continue to be a logical vehicle to move things forward with. It may be, however, again bowing to the wishes of some of the other members of the committee that a more scaled-back version will be what will be marked up, if and when the subcommittee gets to that.

We're looking at a number of possible options right now. NTIA has floated some legislative language which is being looked at, and I'd say the vehicle for moving forward is somewhat fluid at this point right now. Yes?

AUDIENCE: I have a related question to the gal that asked you about the status of the legislation. What's the best pressure point at this moment? Is to write letters to the members of the committee itself or to address Congress?

MR. SHOOSHAN: Well, with the legislative assistant to, at least, one of our members sitting in the audience, I don't want to be put in the position of urging you all to write your members of Congress. On the other hand, I think to go back to what I said, for those of us dealing in communications on the committee level, on the personal staff level, I was referring to Bev Andrews from Congressman Marks' staff, that we are spending a lot of our time on these issues. More and more of the members now seem to be paying attention to these issues, and I would think that just a word or two either in letter or by phone or in personal visit, saying, yes, these are important issues, and use this opportunity, one that we haven't had really since 1934 when the Act was written, to make some basic reforms and changes, to take what is good in the Act and add to it what is needed to move it into the 20th century, let alone the 21st century.

I think that can be very useful, indicating to them that there is a constituency out there for Communications Act legislation. I think that is a key, because you're contending with a lot of other constituencies who want their problems solved first. Any other questions? Yes?

AUDIENCE: Chip, I'd like to expand on something you mentioned earlier about the quarter billion dollar corporation. SBS is much more than just IBM and also . . .

MR. SHOOSHAN: It certainly is and COMSAT General. And I also would add that I was optimistic in saying that both SBS and X-Ten will be doing all these wonderful things. I must say that they both have some significant regulatory, and in the case of SBS, perhaps judicial hurdles to clear before they get there, and, again, I think part of our general concern is sweeping away some of those barriers so that it doesn't take something like SBS which has really been around in concept for the better part of a decade now. It used to be a different partnership proposing to put it together, I mean, so we don't see these things wither on the vine and die, but you're right, I should credit to Aetna and to COMSAT for their role in that as well.

AUDIENCE: Why is common carrier more important that broadcasting? Can you elaborate on that further?

MR. SHOOSHAN: I don't make those decisions. The members make those decisions. I think because we're talking about an industry that has so many indirect implications and impacts on our society in common carrier. We're also seeing, when you look at satellite, when you look at what's happening in microwave, when you look at what's happening in terminal equipment, this is the area where technology has really taken off and where the regulatory barriers are perhaps the most severe and causing the most damage.

I think Mr. Van Deerlin speaking on his own would say that there are critical reforms that are needed in the broadcasting area and the cable area and public broadcasting area, but the word from the other members of the committee were not now, it's too much, we don't want to deal with all that at one time, but, as he has indicated in the speech he gave in New York about three weeks ago, he intends both this year and in the next Congress when at least he will be back to keep pressing in these other areas, and I think that ultimately we will see changes enacted in all of the major areas, maybe not quite the way they were proposed in the rewrite, but I think that legislative change is being perceived as more and more needed in many of these areas as we go along. Any other questions? I don't want to overstep my time.

DR. YOUNG: Thank you so much. We've kept you far too long. It's been a pleasure.

MR. SHOOSHAN: Thank you.

(Applause.)

DR. YOUNG: I want to join our chairman in thanking Chip so much for being with us. It was lively, it was fun, we got a lot of good information, and we're in your debt, Chip. Thanks again. We'll take a break for coffee now which, I understand, will be, or is, outside the room and please come back promptly so we can convene our next panel at 10:15.

(Whereupon, the conference briefly adjourned.)

Remarks
By

Polly Rash
Director of Communications
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

My name is Polly Rash. I'm the Director of Communications for the Consortium. The Consortium is honored this morning to have the distinguished representatives of four of America's common carriers with us. Each will speak, and then there will be a question and answer period following the four speeches.

Our first speaker is Andrew Inglis. He's President of RCA American Communications and has been since January of 1977. RCA AMERICOM owns and operates the RCA domestic satellite communications system which consists of two high capacity satellites in orbit and a growing network of earth stations in major U.S. cities. A third satellite is scheduled for launch in December and, as you may have read recently, RCA requested authority from the FCC to launch a fourth satellite in June of 1981. Mr. Inglis is going to speak on "The Sky is the Limit."

Systems of the 1980s

"The Sky is the Limit"

By

Andrew F. Inglis
President
RCA American Communications

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Polly, and welcome, ladies and gentlemen. I have chosen the title, "The Sky is the Limit " for my talk; in truth, we at RCA U&LC believe this to be so, as the space limitations in space and the orbital arc will probably determine the limit of satellite distributed programming in the public interest, and this is such a serious question that I'm going to devote a good bit of my remarks to that problem.

A few short years ago, we were much more conservative in our estimates of the growth of satellite communications, and we have been surprised at the speed, for example, with which television programmers have grasped the significance of satellite communications. Only two years ago I told the American Federation of Television and Radio Artists that there were 375 cable TV systems receiving programming via satellite. At this time, there are now over 1600 cable systems that are receiving programs via satellite, and that number is growing everyday.

We carry more than 10,000 hours of cable television programming a month, and we expect this to grow to 14,000 hours in the next year or so, as our third communications satellite and our second satellite network comes on stream in March of 1980. Along with an increase in cable programming, we also anticipate an increase in the TV network programming such as carried by the major networks, including NBC, CBS and ABC as well as Mutual and others for our satellites or those of our competitors.

I'd like to talk to you a little bit about what we're doing in the public service area, and let's begin right here in Washington. All of you, I'm sure, are familiar with the Cable Satellite Public Affairs Network, CSPAN, which broadcasts over our SATCOM I satellite to the cable TV industry. CSPAN was envisioned as a medium by which America's cable TV audience would be able to witness activities of the House of Representatives. The September 17th issue of U.S. News and World Report, it was reported that the first six months of televised House proceedings have turned out to be surprisingly popular.

Indeed, cable TV systems in all 50 states are bringing gavel to gavel coverage to an estimated audience of six million homes in 400 communities. The CSPAN system, I am

pleased to say, is now being expanded as the close of the foundation and a joint venture with CSPAN and will begin in December of this year to bring to more than a thousand high schools across the country specialized television programming of national government affairs. Close-Up is a non-profit, multi-partisan, educational foundation that is able to provide this programming through a unique partnership of education, business, labor and government.

Another new public service program offered over the RCA U&LC system is the Appalachian Community Service Network. This provides cultural and public service programming to specialized or underserved audiences in order to meet local needs and interests. The Appalachian Community Service Network utilizes transponder 14 on SATCOM I from 7:00 until noon, New York time, and additional time will become available when SATCOM III is launched in early 1981.

I think it is appropriate to mention some of the public interest broadcasting carried via satellite for commercial networks. You all remember President Carter's much publicized vacation in the Grand Tetons, and his trip down the Colorado River, and, more recently, the United States Mini Olympics for broadcast from the U.S Air Force Academy in Colorado. In both instances, a portable up link earth station had been used to bring the American public live and taped coverage of these newsworthy events. Both of these examples serve to illustrate how satellites can be used to bring to the public such events as occur in isolated areas.

Last year we were very much involved in the first practical demonstration using an operational United States satellite to provide multipoint, two-way teleconferencing and other programming for the American Indian community. In a demonstration, it was shown how satellites can provide new medium of communication between tribes, educational institutions and the federal government. Two-way video teleconferencing was established between Anchorage and San Francisco. At the same time, signals were received at Reno, at Laurel, Montana, Zuni, New Mexico and in Washington, D.C.

In a similar demonstration, the RCA satellite system was used in a unique two-way teleconferencing last May between President Carter and delegates to the National Cable Television Association Convention in Las Vegas. Convention delegates and the President participated in a two-way discussion while proceedings were made available to approximately 13 million cable subscribers nationwide.

As a last example of RCA U&LC activity in the public interest, I would like to refer briefly to the tremendous benefits that satellite communications bring to remote areas in Alaska. Prior to the SATCOM system, most of the bush communities in Alaska were for all practical purposes isolated from civilization. Tenuous links were maintained by unreliable radio, unreliable due to weather vagaries and not to faulty equipment. Now, however, nearly every community in Alaska of 25 persons or more has telephone service, both interstate and intrastate. More importantly, these

communities have quick access to the state emergency medical service that provides round-the-clock assistance in case of accidents or serious illness. Further, these communities are now able to receive television programming carried over the state television system. Programming originates over the major networks in the lower 48 states and also consists of educational and cultural material that would otherwise be available.

Well, so much for what is happening today. What do we see for the future? As I mentioned at the beginning, the overriding problem we see is increasing the capacity of the satellite communications systems and we have responded to this with plans to launch a third satellite, SATCOM VII, in December, as Polly has stated earlier and a fourth SATCOM IV in mid-1981. Very soon, certainly during the next decade and probably sooner, we will run out of orbital slots. These are the fixed locations where satellites can be placed. We replace them with the necessity for increasing the amount of traffic which can be handled by each satellite.

We have in the past and continue to devote a considerable portion of our technical resources towards the solution of this problem. We were pioneers in the use of cross-polarization which doubles the capacity of each satellite. Our satellites have 24 transponders each, and they're in groups of 12 which reuse the same frequencies and get isolation by cross-polarization. We have actively pursued techniques for increasing the number of television channels which can be handled by a single transponder, and we are routinely transmitting two television channels to Alaska on one transponder. We have demonstrated another system which doubles this again to a total of four.

In our next generation of satellites which will be launched in the 1983 time frame, we are incorporating a number of developments which will continue to increase this capacity. Higher power, greater linearity and advanced modulation methods are elements which we'll include in this among others.

In pursuing these developments we must, of course, be influenced by economics as well as technology. Here we are encouraged by the historical trends of the electronic industry which have continually lowered costs even in the face of severe inflationary pressures. Techniques which are not economic today may well become so in five to ten years from now. We are pursuing all practical schemes for increasing capacity and will continue to expend substantial funds to do this. I would like to make an ad lib comment here which relates to some of the questions that were raised in Mr. Shooshan's speech about R&D efforts in this area.

I will state that I think both in the private and public sector, one has a problem of priorities and how do you spend the available funds, and the temptation always is to spend the money for projects which are spectacular, which look good on the front page of The New York Times rather than the more mundane things which are really going to bring about the progress in this industry. I will give one example of this. I'm sure we all agree that Bell Laboratories is one of the greatest research institutions

in the world. They have thousands of professional scientists, some of whom are truly distinguished. Two of them, I believe, got a Nobel Prize for comfirming the big bang theory of the creation of the universe, and yet somehow or other the problem of getting a really reliable battery has eluded Bell Laboratories, as, indeed, it has others, and this is an example of the sort of thing I mean.

I think the advances that we're going to see in technology that are going to be useful and bring costs down and increase capacity are going to be things like better batteries and not the more spectacular "Gee Whiz" things that you may read in quasi-science fiction hand-outs.

Then I would make this statement also, that running a satellite communications company is no game for the faint hearted. Huge sums must be put at risk, and our shareholders and bondholders naturally expect a fair return. You can't sneak into this business by starting small. The cost of a single satellite in orbit is in the order of $50 million, and the problem of providing protection in the case of satellite failure makes anything less than a three-satellite system plus a ground spare uneconomic, so you can just add that right up, and you can see that the opening ante is about $200 million. At that point, you don't have any ground equipment at all.

We have just completed our business plan for the next three years, and I can tell you that we plan to spend several hundred million dollars in capital over the next four or five years. We're prepared to expend this, however, because we believe that the demand for communications will grow, and filling this demand, we will be providing an important, useful service both the private and public sectors.

Now, I could conclude this talk in traditional fashion by giving you a lot of "Gee Whiz" speculations about how I think satellites are going to be used over the next five to ten years, but I'm not going to do this, because I believe I can use your time and mine more efficiently by listening. This is the essence of the free market system of which we're a part, to determine what our customers want and then to find a way to provide it economically and profitably. In fact, some of you are familiar perhaps with our trademark, the dog, Nipper, his master's voice, and I always tell my people that Nipper listens. He doesn't talk, he listens, and that is a good thing for anybody in business to do, and that's what I hope to do in the remainder of the session.

Thank you.

(Applause.)

Remarks
By

Polly Rash
Director of Communications
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Mr. Inglis, for a very provocative talk. James Ragan is Vice President of Western Union, and he joined that company in 1974 as Area Vice President for Washington, D. C. In 1976, he was appointed Vice President, Broadcast Services. Mr. Ragan has responsibility for the television and radio use of the Westar Satellite System including public broadcasting's PBS and NPR satellite interconnection systems.

I don't normally mention where people are born, because I don't think it's important, but in this case I will. Mr. Ragan was born in San Diego. His talk is "Satellite Communications: An Opportunity and a Challenge." James Ragan.

(Applause.)

Systems of the 1980s

"Satellite Communications: An Opportunity and a Challenge

By

James Ragan
Vice President
Western Union

Fourth Annual Conference
Public Service Satellite Consortium

Good morning. Thank you very much for saying San Diego. I migrated east, and I think I'm going to go back, because when I woke up this morning I looked outside of my Connecticut window, and there was snow on the ground, and I thought for a moment that I'd miss the speech here, but, anyway, it worked out well.

I think Mr. Inglis really put it in right perspective when we talk about the carriers want to listen, and this is really the purpose of the meeting, and on that basis, I would like just to say how I tried to structure this talk. My remarks are really directed towards the opportunity and the challenge presented to each of us as carriers, and particularly you, as users, by satellite communications technology, and I think the opportunity resides in the proven service characteristics of satellite distribution systems, and the challenge lies in the translation of these benefits into new services as well as new ways to enhance existing services.

When I thought about that, there was really no more appropriate body to talk to about this subject, because you are the key representatives of the public interest sector, and for whom the use of the commerical satellite systems, I think, is still in its early stages. Since my primary responsibilities within Western Union are television and radio, I will focus on these particular issues, but I think that the message is the same.

Science and industry, and I think as Mr. Inglis pointed out, with large sums of money certainly sees the technical opportunity that satellites offer and have met that challenge. Satellite systems are in place, and they're expanding. Their reliability, performance and economics are well known and accepted by business, industry and government. There are three domestic operating satellite systems in place...AT&T's, ours, RCA's, and one in the wings...so the carriers' readiness to serve in this business equation, public interest equation, is a given.

Trade of service options and innovative pricing philosophies have brought the technology within the reach of the smallest user. As an example, and I know some of you may be familiar with this, but the New York to Los Angeles television service,

one hour during what we call prime time which is essentially early afternoon into the late evening, if you went by land line, maybe $1800. If you go by satellite to the occasional user, it would be $580, and if you did it in non-prime time which would be the early morning hours, it would be $360. Those are pretty low numbers for entry into a system that when you put it up there, it was maybe around $200 million, and you're going to be spending another $100 million, so I think the carriers have been innovative.

Let's look, if we were looking at a multiple point distribution system on the same basis, and since I am in the television business, I'll talk television markets. If I was going to distribute an hour of programming into 25 markets, at the same time if I was going to do it by land line, $4500, if I was going to do it by satellite, $1100. Now if I wanted to go into the top 100 markets and distribute the programming, one hour, well, when you talk land lines, you're talking maybe about $15,000 for that hour, when you get into the satellite, $3000. So the technology is being translated into workable economics.

But, really, this group with its experience in experimental and operating programs on the ATS and CTS satellite system need no sales pitch. So, then, let me go on and say if there's a burden in this business of opportunity and challenge, I think it's shifting from me, the carrier, to you, and I want to outline this by mentioning the growth of our business and by mentioning who's in the business and what they're doing, I think you'll see that the momentum of this shift has occurred, because when the carriers started, they were out promoting the business, and I'd have to say that initially, I think, the satellite carriers may have pursued the wrong businesses, and I think this has been stated a number of time, but we've learned and from the growth that the RCA system can show and the growth I think, we can show, we're now on the right track.

I believe today's application action, I believe the action is on the ground. Now, with respect to all other satellite systems, the balance of my remarks will be on Westar, but that's fair, isn't it? Okay. We have three satellites in orbit. We launched Westar III this August, and we turned it on on September 21, so that's working and functioning well, and we have earth stations in New York, Chicago, Los Angeles, San Francisco, Seattle, Dallas and Atlanta, and for our television and radio business we have operating centers there that serve those customers.

Now the use of satellites for audio program, radio program service, is accelerating rapidly, and its development is paralleling what's happening in the television business, but it's slightly behind in development than the video business, so I'd like to just talk about television first. I don't think I have to mention what's happened in the cable television market through the hard work of the cable television operators and some programmers and RCA, but what it certainly proved is that when CATV had a very real revenue need, satellites delivered it.

No less significant has been the development of satellite services to the broadcasting industry, and that's one I'll address right now, and when I'm talking the broadcast industry, I'm talking television and radio as we normally know it. When we first started out in that business, satellite was, and I don't like to use the word cheap, because it's inappropriate, but it was an inexpensive back-up to land line transmission, and it was basically point-to-point among selected cities, and when we started our video service, we started it in July of 1975, and for the rest of that year, we did 275 hours of television programming.

In 1979, we estimate by the end of the year the satellite in commercial television programming will exceed 20,000 hours. If PBS' television programming was included, this figure would almost double. Now these 20,000 hours are what we call occasional service, and they represent approximately 12 to 13,000 separate television events, some of which may be five or ten minutes, some of which may be multihours, and in business mix, 20 percent are sports, 50 percent are news, and the rest are entertainment and some specials.

We foresee no leveling in this activity, and we think there's a simple equation that describes what's happening in satellite broadcasting and illustrates why we believe there is an era of even greater growth ahead, and it really is a very simple one. The question of the chicken and the egg was solved when the satellite was put up there. Then you had earth stations going in which could deliver an audience, and that became of interest to the programmers, so the programmers put the programming up on the satellite. More people became interested, and they put in more earth stations, and it's just been rolling forward.

The equation does work. It worked for the cable industry, and I think the number is talking around 1600. Well, it's doing the same thing in the broadcasting industry.

Just with our current television and radio customers, we estimate by the end of the year 1980, a terminal population exceeding 1300 earth stations will be using Westar on a full-time basis. Now there are a number of things in the marketplace which have contributed to the growth of our television broadcasting business. Obviously probably one of the most significant ones, I believe, is the decision of CPB and PBS to create their satellite interconnection network. This was a major step forward, and I know through your organization, the PSSC, you have been able to use those facilities and experience firsthand that capability of the system. Also, in the Western Union development of the broadcasting business, we had a very active customer base, customers who grabbed the satellite challenge early in the game in 1975, and these were the Robert Wold Company...names that I know you're familiar with...Robert Wold Company, Independent Television News Association, the Hughes Television Network, Spanish International Network, ABC and CBS, all early users and all growing, and it's continuing.

Broadcasters, such as Westinghouse Broadcasting Company, Group W, Storer Broadcasting Company have all made decisions and announced decisions to put in their own earth station network, and, of course, in the marketplace, there have been significant advances in earth station technology that productions put down cost, and this has all contributed to the situation.

Non-broadcasting applications, they've been many...teleconferencing, medical symposium, union conventions, sales promotions, and even a law course. We interconnect with the international carriers on a routine basis, and the services that we employ in the way the networks are set up in a mix of our facilities, other carriers' facilities, ground and space, and they're each tailored to meet the specific requirements.

Now to the future, and the proof of the pudding is, does the carrier believe what's happening, and I think we believe it. We launched Westar III, and we've got other ideas on the plan. Western Union has made a major commitment of its satellite resources to the television and radio business. In fact, we configured our current system so we can make more room for television and radio type services. Also, we hope in the near future there will be FCC action on the PBS shared earth station application, and when that occurs, we believe that this can dramatically expand our satellite service capability.

I don't want to take much more of your time, but I don't want to by-pass radio, because radio has been very active, and it's grabbed not only the economics of satellite, but also the quality of transmission and getting into what we would call stereotyped transmission. We know that the National Public Radio Satellite Interconnection system started on October 1. Later this year, the Mutual Broadcasting System will initiate satellite service through small earth terminals. There's Associated Press Radio, RKO Radio Network, Physicians Radio and Musak are also planning to go up on the bird, and we hope to see them in service in the early 1980's.

Now many of these earth stations that are going in, the 1300 that I mentioned before, looking at the Westar system, are situated in major metropolitan areas, and most are designed with future growth and service diversity in mind. The potential for use is significant. We are a proponent of shared use as a matter of good technical and business sense, but also as a means to open up the satellite system to more users. For example, it's my understanding that AP Radio and RKO Radio Network have now filed their shared use application with the FCC.

I think that I'm optimistic about the future is a point that I hope that's come through, and it's really in a few moments not possible to hit all the details and all the support we've received that gives us optimism for the future, supporting the marketplace, even support from our competitors, and it works both ways, because we're both pushing the satellite business, but there's two big items that stands behind all of it. First of

all, it works, and, as we look at our business curve, it is obviously that people like it. So my feeling today is that the challenge is to the user. The action is on the ground, earth stations, programming, and we look forward to working with you, because we want to continue to make things happen.

Polly, I thank you very much.

(Applause.)

Remarks
By

Polly Rash
Director of Communications
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Jim. We've had two very interesting talks and two more to go. Joseph Pelton is our third speaker. He has been involved with satellite application since 1965 in various positions with North American Rockwell, NASA, George Washington University, COMSAT, and now with INTELSAT where he's Executive Assistant to the Director General

Dr. Pelton is the author of articles and reviews and two books. He's currently working on his third book which will be called Global Talk, and it's scheduled for publication next year.

Dr. Pelton's talk today is "Realizing Impossible Dreams: INTELSAT from 1965 Through the 1990s."

Dr. Pelton.

(Applause.)

Systems of the 1980s

"Realizing Impossible Dreams: INTELSAT from 1965 Through The 1980s"

By

Dr. Joseph N. Pelton
Executive Assistant
to the
Director General
INTELSAT

Fourth Annual Conference
Public Service Satellite Consortium

Those of you from Hawaii and San Diego, welcome to Washington. We arranged a rather flaky reception for you, I'm afraid. The windstorms and sandstorms are scheduled for tomorrow, so stay tuned. Washington, of course, is noted for a place for visitors to come. When I first came here, oh, about 13 years ago, John Roche said that don't be fooled, that's not smog hanging over the city, that's neuroses. Another wit characterized Washington as a city of northern hospitality and southern efficiency. Time has borne that out.

This morning, I'd like to talk to you about INTELSAT and impossible dreams. You know what impossible dreams are. They are the things that Alice and the Queen of Hearts discussed in Alice in Wonderland. When Alice just claimed you couldn't believe in impossible things, the queen chastized her for simply not practicing enough. She said, "When I was your age, I sometimes believed as many as six impossible things before breakfast," and when I first started working in satellite communications 14 years ago, I had to practice accepting as commonplace the workaday world of this exciting new technology. Indeed, even the most jaded of INTELSAT's employees cannot help standing back and allowing themselves to be amazed by how rapidly the miracles of satellite communications technology have shaped world events and opened up new opportunities and benefits to literally billions of people.

May we have the first slide please? Next year INTELSAT will provide the satellite links to distribute television coverage of the Moscow Olympics. A new world record audience of one and a half to two billion people will watch this spectacle. Marshall McLuhan's metaphor of a global electronic village each day moves closer to reality. Each day, what was once considered an impossible dream becomes a little bit more believable. Let's briefly review the growth of the INTELSAT system over the last 15 years before exploring the exciting world of tomorrow.

In April 1965, Early Bird, the world's first operational satellite was placed in service over the Atlantic/North Atlantic region. Early Bird demonstrated years before it was thought possible that operation of a satellite of geosynchronous orbit, some

22,300 miles out in space was indeed technically feasible and economically viable. Two years later, the INTELSAT II system began to be deployed. This system provided service in both the Atlantic and Pacific Oceans and covered both the northern and southern hemispheres. The INTELSAT system was deployed primarily to meet NASA's requirements for ship communications in support of its early manned space missions, Mercury and Gemini.

The INTELSAT II's main innovation was that it was for the first time allowing operational multipoint to multipoint service. It is this capability that makes satellites such a radical departure from submarine cable technology that is strictly point to point service. In the late 1960's, the INTELSAT III series was deployed in the Atlantic, Pacific and Indian Ocean regions to establish a truly global system. These satellites had a mechanically despun antenna that for the first time allowed effective focusing of the antenna beam to the earth's surface. With the INTELSAT IV series in the early 1970's came the era of the giant satellites. the INTELSAT IV, unlike the INTELSATs I, II and III that preceded it, had to be launched on NASA's Atlas Centaur launch vehicle rather than on the smaller Delta class vehicles.

This satellite contains spot beam antennas to allow the irradiation of power to targeted, high density traffic areas on the earth below. In the mid 1970's, INTELSAT began to employ the INTELSAT IV-A satellites. These satellites, standing some 27 feet high, include a sophisticated antenna structure to allow frequency reuse in different beam patterns. Over the Atlantic, for instance, the east beam covers Europe and Africa while the west beam covers North and South America. Today, the lack of frequency and interconnectivity rather than the lack of power is the main constraint on the growth of satellite services. Indeed, frequency allocation is the main subject of concern at the World Administration Radio Conference now in session in Geneva.

Increasingly, therefore, satellite designs will be concerned with finding more and more ways to reutilize radio frequencies more efficiently and to achieve telecommunications interconnection in space. Next year, INTELSAT will begin to deploy the INTELSAT V satellites. These satellites with a solar panel wing spanning some 60 feet will be stabilized on all three of its axes by an inertial wheel mechanism rather than be spin stabilized like all of our previous satellites.

The INTELSAT IV-A and V satellites will form an operational network of ten satellites operating with some 300 earth stations around the globe controlled by INTELSAT's operation center in Washington, D.C. This system will provide for international and domestic services well into the 1980's. In a period of just 15 years, therefore, INTELSAT satellites have grown in capacity from 240 channels, the capacity of Early Bird, to a network of satellites each with the capacity of six to 12,000 voice channels plus two high quality color television channels.

As INTELSAT has grown in its technical and operational capabilities, it has grown institutionally as well. Starting with a membership of just 11 countries, INTELSAT today has 102 member countries. Since it's a question that frequently comes up, I would like to note that the 98th country to join INTELSAT was the Peoples Republic of China and that the Soviet Union, although not a member of INTELSAT, is an active user of the system with three antennas in operation.

With expansion has come increasing cost efficiency as well. When INTELSAT started service in 1965, the rate for half of a complete duplex voice circuit was $32,000 per year. Today, 15 years later with no adjustment for rapid world inflation, the rate of the same service is $5760 per year, and next year may drop below $5000. As cost has gone down, reliability has gone up. The INTELSAT space segment has for the last few years consistently maintained a reliability rate of greater than 99.9 percent. Today, INTELSAT provides more than two-thirds of the world's overseas international telecommunications service requirements, and provides domestic services to some 16 countries that range alphabetically from Algeria to Zaire.

Despite its achievements, INTELSAT today must look to a new set of possible dreams for the 1980's and the 1990's. INTELSAT is currently exploring how it might effectively provide expanded capabilities for a variety of new services for both developed and developing countries in the 1980's, for domestic rural telecommunications, for business communications, for video conferencing, for electronic mail, and for many other new requirements.

Our studies of domestic services, for instance, are examining ways in which high-powered satellites might be able to provide domestic services to small antennas of the four to five meter class. Demonstrations with such small antennas have been conducted recently in Nigeria, Norway and Saudi Arabia, and a series of new demonstrations will begin in the not too distant future in Peru, partially under the sponsorship of the new AID program. Such systems may be well suited for the provision of a variety of new services, including telehelp, agricultural research and educational programs, to cite only a few examples.

INTELSAT is also examining effective means of providing international and data communications for the 1980's and 1990's. Already today, the INTELSAT V satellite can relay a billion bits of information per second. Perhaps, in more understandable terms, this is like saying the capability to transmit the entire Encyclopedia Britannica six times over in a minute. Domestically, within the United States and Japan and most of Europe, there is today an explosion in data communications that will eventually include digitized voice, digitized video conferencing and digitized picture-phone. In the not too distant future, this domestic digital communications revolution will make its impact felt upon international telecommunications as well.

Indeed, at the rate information and communications requirements are growing, a cross-over point will be reached perhaps in the 1980's or early 1990's wherein the prime

communications requirements will be for machine and data communications, not for direct human interchange.

Finally, INTELSAT may provide entirely new forms of services starting in the 1980's. The later production models of the INTELSAT V starting with the fifth in the series will be equipped to provide maritime mobile communications. The new INTELSAT service may also, however, include aeronautical satellite to satellite data relay and other services. As you might well guess, designing to meet impossible dreams is not an easy task. The requirements are exacting and the tolerance for error is low. Our plans must allow for rapid growth in excess of 20 percent a year. We must be able to adapt to technological breakthroughs, not only in satellite communications, but also in competitive technologies like optical fiber and submarine cables.

There is a need to plan effectively and efficiently and to implement at the right time sophisticated and, therefore, high cost facilities, facilities costing millions of dollars. There is a need also to contend with the problems created by proliferation of satellites and increasing radio frequently congestion, perhaps one of the unexpected side benefits of deregulation, which Chip Shooshan was talking about earlier this morning.

There's a need for INTELSAT to remain a common denominator in a global telecommunications environment where a variety of technical standards abound. There's some seven signaling and switching systems in operation in the world today. There's also a need to react to diverse economic, political and technical concerns of more than 100 countries. At the present time, INTELSAT is exploring the most effective means it might take to provide domestic telecommunications services on a planned basis. In the past, it's only been on a spare capacity that's available that we provide the service to 16 countries.

At this time, INTELSAT is examining concepts, such as small dedicated satellites for domestic services, the possibility of a modified INTELSAT type design with switchable antenna beam configurations that could allow the satellite by electronic command to be reconfigured from an optimized design for international services to an optimized design for domestic services. And, finally, we're exploring a hybrid satellite concept which would allow a smaller satellite to meet either domestic service requirements or international requirements that involve smaller volumes of traffic, such as the Atlantic, major path two, or the Indian Ocean, major path one.

Although all aspects of this decision are still unresolved, the current focus is most heavily directed toward the hybrid and the multipurpose switchable INTELSAT V concept. INTELSAT is also examining satellite designs that might be appropriate for the INTELSAT VI satellite to be deployed later in the 1980's. One of the most promising designs currently under study is the INTELSAT VI concept. This is not a specification. This is just a satellite concept, but anyway this satellite would have a capacity of over 40,000 voice circuits plus television channels and would have the great advantage of being technically compatible with both FM, or analog communications

which is the mainstay of the system today, but would also be compatible with the coming digital communications revolution, and, in particular, the time division multiple access system that would be implemented by many countries and by INTELSAT in the 1980's.

One of the possibilities under a heading one might call "Achievable Impossible Dreams" would be the operation by INTELSAT of the global network of application space platforms, GASP, for short. Such a space platform or a satellite cluster connected by a central switching satellite concept, such as Hughes as recently put forward, could provide, in addition to telecommunications services, meteorological, earth resource and other services. Such a system might be able to provide millions of voice circuits, data channels that could relate trillions of bits of information per second or hundreds of TV and video conferencing channels.

This GASP network may today draw gasps of disbelief, but if a spirit of economic, political and economic cooperation, such as INTELSAT has enjoyed over the last 15 years, can be maintained, vitually no feat must necessarily be judged impossible. The potential of a first GASP system, as opposed to last GASP system, is enormous in terms of social services, of social benefits, and man's aspiration for peace and understanding. INTELSAT hopes that it can in partnership with the United States and the other 101 member countries play a significant role in making such important dreams come true.

Thank you.

(Applause.)

Remarks
By

Polly Rash
Director of Communications
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Dr. Pelton. Our last speaker in this group is Neil Helm, and it's a pleasure to introduce him. He's a valued friend of many of us on the PSSC staff.

Neil joined COMSAT in 1967, and for five years assisted the U.S. Technical Delegation to INTELSAT. He then transferred to COMSAT Laboratories where for seven years he was responsible for development applications and product evaluation. Neil recently returned to COMSAT headquarters where he is now Manager of Marketing for the Systems Technology Services Group.

Neil Helm.

(Applause.)

Remarks
By

Neil R. Helm
Marketing Director
Systems Technology Services
COMSAT

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Polly. Ladies and gentlemen, good morning. I don't even have a title for my presentation this morning. When Polly asked me to do this, she said talk about the new plans and technologies, where you've been and where you're going, so that was too long for a title, but that's some of the things I'm going to try to cover today.

Also, I'm a great believer in slides and pictures. I think they're worth more than thousands of my words, so I have a lot of slides. I'm going to go through them fairly rapidly, so sit back, and we'll go through some programs and some technologies and look at where COMSAT is going also. So let me grab the slide indicators and get pointing the right way here. There we go.

I wanted to sort of follow up on Dr. Pelton's impossible dream. This was the first earth terminal that I had the privilege of climbing around on. It's the old horn in Andover built by Bell in the early sixties for relay and syncom, and there's a man... well, you just can't see him, but understand that the wheels of that old dish are six feet high, and the face of the horn is 70 feet. It's a huge thing, 370 tons, and when I came back from walking around that, I was tasked with working on terminals that would fit on planes and ships, so impossible dreams.

But we did. We moved on. There's the Andover Earth Terminal Park, you might say, and the ray dome in the back covers the old horn, and we had to go from these large earth stations down to a small terminal in '73, one of the first experiments that I was involved in putting a roughly...well, smaller than two meters...1.8 meter terminal on a moving ship. We worked with the Queen Elizabeth II. The Cunard people put this antenna on as part of a demonstration and experiment using the INTELSAT system. It worked very, very well. The Navy followed it up. In addition to testing out small terminal technologies, we used digital communications. We used facsimile for weather, and we really tested out a new system that both the Navy and commercial ventures were to pick up on.

We designed and worked on a small terminal that eventually became part of the MARISAT system, and I sort of wanted to start off with that introduction to say that there

are research and technology and experiments and demonstrations that you people have been involved in that are a natural part of all of these systems, so getting this right up to a modern system, the MARISAT system which covers all three ocean areas, and now over 200 ships at sea are equipped with terminals. This is the satellite.

It's interesting to note that the next slide shows us that this was a hybrid system in which part of the capacity was used for the U.S. Navy, and part of the capacity for commercial interests. I think before we entered into these kinds of discussions, few people would have felt or did, in fact, feel that we could have that kind of a shared satellite system, but the economics of the time forced us really to go with the shared system, and it's worked very, very well.

Here are some of the services that this system offers. You can read as well as I can see, but it is a very sophisticated, real-time, full-time system that's been operating now for a number of years very successfully. Again, the above deck terminal, a little under one meter, very small and simple, where it works under a ray dome, as we can see, the white ray dome in the front of this Esso tanker, and works to the very small below deck terminal. This is a whole earth station, that little antenna updecks and this below-decks terminal which has both telephone and teletype and facilities for data and facsimile.

The new ships are certainly picking up on this service which is giving a new dimension in maritime communications; as this whole industry is getting more complex, the needs of communications are growing, and it's now very difficult when you talk to these ship owners to say that they could have the kinds of shipping systems out there without the communications that the MARISAT system has brought to them.

Also, a lot of research ships are using the terminals. The Calypso ship which is quite famous is using it for their underwater programs. We have a large number of terminals mounted on oceangoing and also large oil structures, drilling platforms, that are in shallower water, and the MARISAT system is used to bring the data back from the well to the offices of the oil companies. So here's a system, in summary, that COMSAT General has been very successful in operating, and COMSAT has been designated the MARISAT representative for the United States, so we will continue to transition this type of service into the international maritime communications systems in the world.

Going on, the one slide that didn't pop up there was of the earth stations system in Connecticut and also on the West Coast that is used for communications for the MARISAT and that COMSTAR system. The COMSTAR system, COMSAT designed and launched and controls for AT&T, GT&E system, COMSAT General does this. Again, this system is working well, and we went through the construction and launch phases of the program. The three satellites are in orbit, and the restrictions, the service restrictions on AT&T have been removed as of last July, many of the restrictions, and I think you will see that system changing. I cannot speak for AT&T, but the satellites are working well, and that system is one of the domestic systems.

Going on, Satellite Business Systems is a joint venture of COMSAT General, IBM and Aetna which we heard about again this morning. When you look at the growing importance of information, expanding capabilities, of data processing, when you sort of get into the office of the future concept, you'll see the direction that the SBS system is going. Certainly, I think, the characteristics of this system at 12 and 14 gigahertz, customer premises earth stations, digital dynamic system, it's certainly going to be a great system of communications in the near future.

While the system is still going through hearings, we are moving ahead and talking to customers, lining up services. The tariffs are going to be listed, I think, next month, and we are continuing to build the satellites and procure the ground equipment, and that system is going ahead.

INTELPOST is a new experiment that we're doing with the USPS, with the postal service. This is an international system which is presently in operational demonstration phase. If you take a letter or any kind of a document down to L'Enfant Plaza to the central post office and pay a certain amount of money, it can be sent to England and very soon, Germany and the Netherlands will be up as part of this system, and Argentina, Belgium, Switzerland, Iran, our other countries that are already planning to participate and a number of countries are also indicating that they will become a part of this present demonstration system. We believe that this international mail system is just the beginning of a very large communications system that will assist us all in our mail delivery problems in the future.

Again, just a picture of the number of the countries that are participating in the INTELPOST system.

Going back to impossible dreams, this was the first transportable or the first small terminal that we utilized in a demonstration in '69. Stanford University, the National Science Foundation and COMSAT jointly put this small terminal on Anarctica. It was an unmanned data platform which sent back meteorological information on a low data rate through the INTELSAT satellites, and this system worked for two winters down there fairly successfully, and, again, showed that we could work with small, unmanned platforms and proved a number of the technological areas that we had to do to go from there to now a demonstration program that's becoming operational with COMSAT General. It's a data gathering program. This is a hydrological sensor. The sensor goes down into water to a river, and data is being sent back through the satellite collected from a number of these terminals by a central facility and computer analyzed, and we feel that this is the direction that a lot of data gathering is going in the future.

That's why COMSAT was desirous of purchasing a new subsidiary called Environmental Research and Technology, a Boston-based corporation, which deals in this kind of data gathering, and we feel this is one area that COMSAT is going to go. In addition to communications, we're going to go into the data gathering market.

Here is the system configuration of that demonstration. A number of sensors were put out. Again, that system worked very, very well with the USGS in an experimental demonstration.

This is a picture I'm putting up to emphasize another new program that we've just recently announced. We call it STEREOSAT. We are planning on a remote sensing satellite which will map the entire globe in three years. It will take nearly that long as some areas of the world have cloud cover, nearly continuously, so even though the satellite passes over many times during that period of time, to get the entire world in a cloud-free, smog-free picture takes that particularly long. We feel that this information along with LANDSAT will allow for greater agricultural understanding. It will specifically give the mineral and oil exploration people, for the first time, a full, good global map, and we think that this is going to be a very important program, and, again, it's breaking out of the sort of traditional COMSAT communications area into a new area of remote sensing.

This is our typical housewife at home, and if you can see, in fact, if you'll even push it down a little more, there he is. There's your COMSAT technician very quietly putting up a new direct broadcast antenna. One of our programs that we're planning is the introduction of a direct broadcast service. It's still in the planning stage, but we are looking at the offering of a number of channels on a paid subscription TV basis. These channels will be used for cultural, educational and for entertainment purposes.

The antennas, I think that one extends up a little higher than my design, would be... we certainly haven't gotten to the stage where we've designed antennas yet, but I could foresee a very triangular module that would fit on the slope of any house. The dish would be angled within that triangular pod, sort of, and as opposed to sticking up...this is a fairly flat-roofed house...we think that most of these antennas would be tucked away in the slopes of roofs and really won't be visible.

This is a small antenna that we used as part of the CTS program. I want just to use it to emphasize that we've done a lot of work on small terminal designs, and we're continuing to do this kind of research and technology at COMSAT, specifically COMSAT Laboratories. This was a terminal that we used for disaster communications purposes in the CTS experiment. That's the whole earth station there. It weighed approximately 150 pounds. We loaded it into the back of a van, and when the flood hit Johnstown, Pennsylvania in July of '76, we were called, and responded fairly quickly and set this terminal up at Red Cross Headquarters in Johnstown, and for a while, were the only effective communications in and out of that flood area.

We're continuing to work on that concept for national and international agencies of providing disaster communications services, again, one of the things that we're working on and planning on at COMSAT.

But, certainly, with all of our plans and aspirations, we're running into, as our other speakers have mentioned, orbital growth and orbital fullness, and one of the ways that we're trying to look at all of these programs and how we're going to aggregate them, and, as Dr. Pelton used, one of the ways that we're going to have to look at the number of missions that are rapidly growing and know that something is going to have to happen because the geosynchronous orbit simply cannot handle the number of planned missions for that...what is becoming a very valuable resource.

And, then, we look at the direction that technologies are going, and we see that the antenna on little INTELSAT I and the antenna growth all the way through the INTELSAT V and the ATS-VI experimental satellite shows the trend in antennas so that it's natural to see that the antenna farm concept is one way of overcoming the proliferation of missions that we're going to have to deal with in the eighties and nineties.

We're doing a lot of work at COMSAT Laboratories on very complicated antenna arrays, lens systems, phase deray systems, and we feel that this work will allow us to use and reuse the frequency spectrum many times for a lot of the efficiency we're going to have to have to utilize all those missions, and, also, we're going to have to go into what Dr. Pelton says GASP. We call it OAF, Orbital Antenna Farm, and what NASA calls a geostationary platform. COMSAT is working on this. We realize that you come up with many, many efficiencies of scale, if you go in this direction, and we think it's a natural direction that satellite communications are going, and with the Space Shuttle, you can or you will be able to take fairly large platforms into lower earth orbit where you can erect them, and on a tether there you see the second stage rocket which will be mated and will push this platform upto geosynchronous orbit where it will be unfurled, and the modules will be put into place or will place themselves, and we think that's the kind of early platform.

Certainly if you look at TDRSS, and you look at some of the satellites that are even now being designed, they're beginning to look more and more like geostationary platforms, and as you can see the number of modules there, each one of them will be a separate mission, each one of them will perhaps have its own ownership. I won't try to get into the economic and ownership and legal areas of this now. We're just simply looking at the technology.

Certainly in the nineties, we would hope, as you can see a person tethered out there, to be able to service these in orbit, but that's certainly into the nineties, and there has to be a very economic, what we call space vehicle to go back and forth between low orbit and geosynchronous orbit to make that economic. We think that the future will look...the future of satellite communications...will look something like this. I know that Mr. Inglis didn't want to get into this area. I'm just going to touch on it.

I think just as a trend of where we're going, we think there will be large platforms. They will be connected with intersatellite links, and many missions will be handled on

each platform and while there are a lot of problems to overcome, and this look like an impossible dream, COMSAT is working in this direction along with NASA and certainly other organizations and institutions to provide more services and communications alternatives for the many requirements that you people especially are asking of the carriers today and will ask tomorrow.

So, in summary, I've gone through a look at some of the programs we're looking at, some programs we have ongoing right now, some that we're looking at in the future where we're working on technologies, and we hope to also be a listener and see if we can mate some of our future thoughts into some of your future requirements.

Thank you very much.

(Applause.)

Questions and Answers
By

Andrew F. Inglis
James Ragan
Dr. Joseph N. Pelson
and
Neil R. Helm

Fourth Annual Conference
Public Service Satellite Consortium

MS. RASH: Thank you, Neil. Before we open the question period, I'd like to remind you all there is a message board outside by the registration desk. Please do check periodically to see if you have any messages. I was handed one which was labeled "Urgent" for Bill Klot of RCA. Is he in the room?

Okay. We've got four listeners up here who are now ready, and, I think, eager to take your questions...Andrew Inglis of RCA, James Ragan of Western Union, Joe Pelton of INTELSAT and Neil Helm of COMSAT. For the courtesy of those who may not be able to hear your soft voice, we have a floor mike in the middle of the room, and I suggest you use it unless you're sure you have a very carrying voice.

Who would like to ask the first question of our panel?

AUDIENCE: I would like to ask Mr. Inglis about the status of SMARTS-II, if that is not in competition with NBC, and if that might not become obsolete with the development of the home?

MR. INGLIS: How much time do we have?

MS. RASH: You have all the time you want.

MR. INGLIS: We first announced...it's an acronym. For those of you who may not be familiar with it, it means Selective Multiple Address Radio and Television Service. It's primarily a television service, but we put the R in there, because SMARTS sounds better than SMATS as an acronym, and it is a service which we proposed in which RCA would install earth stations on the premises of television broadcast stations. The programs would be distributed in scrambled form over the satellite, and we would use selective descrambling by means of a signal sent out from our command center.

We would formally activate the descramblers or give the proper code word to the descramblers that the programs distributor wished to reach. We stated at the time that we're

not making a firm offer of this because we wanted to expose it to marketplace to see what the response would be and so on. We now have done this, and we are offering it on a limited basis. We are requiring customers who wish to use this service, program distributors, networks, to sign up for a minimum of five hours a day of programming and to go to a minimum of 20 earth stations.

We also are...the initial system will be somewhat simpler than the rather sophisticated one that we developed. We found that the technical problems were more severe than we had expected, and so we're continuing a test program involving the Post-Newsweek stations to develop the more sophisticated scrambling and control system which we first announced. In the meantime, the system will be simpler. It will be a simpler descrambler, and we'll just turn it off and on remotely.

We've also made another change in our offering which results from a combination of market and legal pressures, I guess, regulatory pressures one would say. That is we now will permit the TV stations who have their own earth stations to access the system. We'll supply a black box that provides interface with SMARTS. That's the status of SMARTS.

Now your next question was, is this in competition of NBC? Well, of course, this is a distribution system. It is not a network, so the question is whether our customers will be in competition with NBC or not. It certainly will make it easier for an independent network who has specialized programming, foreign language programming like SIN, for example, or sports or what have you, to reach a smaller group of stations much more economically than they could by the terrestrial means. To that extent, it will, I think, lead to a proliferation of specialized networks. Now how seriously this will impact on the major networks, I think, remains to be seen. That's really not my field, and NBC perhaps should answer that.

I'll give a strictly inexpert opinion, that I think that the major networks are going to continue to serve. They're going to be the bread and butter of the supermarket of the entertainment business, and the specialized, more the delicatessins and the gourmet shops will provide specialized programming to more specialized audiences, but this remains to be seen.

Now the third question is broadcasting to the home. Well, I didn't really intend to come here and have a debate. That was not my purpose. I think that there are enormous regulatory, technical and economic problems facing anyone wishing to go into direct-to-the-home broadcast. A very critical question is what's going to happen at WARC. At WARC, the United States is proposing to have frequency separation between the fixed services and the K band and the broadcast services. At the present time, they now share the same frequencies which means they have to share the orbital arc. This limits the number of broadcast satellites and satellites for fixed service, such as SBS. I think the United States' position is correct. It makes a lot of sense, but for reasons I don't fully understand, it is being opposed very vigorously by Canada and many of the Third

World countries, and I think there's a serious question about that, and, of course, there's the question of public interest that has to be resolved by the FCC, what effect will this have, and there are some enormous economic and technical problems, so we don't really expect that. I think COMSAT may be ready in 1983. In our view, that is a very, very optimistic date. We think there's very little chance we'll be operational in anything like that time frame. We could be wrong, of course, but that is our view.

MS. RASH: Thank you, Mr. Inglis.

AUDIENCE: Mr. Ragan, I wonder if you could expand a bit on your statement that the action is on the ground and the burden is shifting from the carriers to the users, perhaps specifically in terms of examples or specifics that you would see the user community doing that it is not now doing, what kind of plans you expect the carrier to have on the user, just precisely what does it mean that the burden is shifting from the carrier to the user?

MR. RAGAN: Well, I think the meeting that you're having here, this convention in itself and this particular organization is a good example of somebody picking up and recognizing that the use of the satellite has to be aggregated, and it's being done by the users, so I think what we're saying is that the carrier, and the carrier promotes its business. Mr. Inglis and I are out there promoting our particular satellites, but we continually have people coming in with new ideas, new concepts, and more and more people are becoming aware of what the satellite can do, what its qualities are and what it can't do.

The satellite can do a lot of things, and a lot of things it can't do, and this awareness is coming out. When I say the action is on the ground, to make the satellite really work as a multi-point distribution system, it is the installation of the earth stations, and that's what we're seeing. Remember, when we first started, it was just really point to point, and that was about it. Now you're finding more and more earth stations going in on the broadcasting business, so it's the installation of the earth stations occurring, and that's occurring because more and more programming is getting up there, and it's the recognition.

What I'm really saying, it's a here and now situation, and again, we can all look down to the futures, and, granted, the future always comes, but today you have three fine working satellite systems and one, I'm sure, coming on, the fourth, and they're here and now, and I think they should be used, and the people that are going to use them are sitting here and on the ground.

MS. RASH: We'd agree with that. Other questions?

AUDIENCE: I have a question for Mr. Helm. As you conceive the COMSAT direct-to-home system, will COMSAT plan to set up its own sixth program division for each of the channels or would you contract with program suppliers or agencies to aggregate the programming?

MR. HELM: Well, there's certainly a lot of questions that we haven't, you know, dealt with yet, and we, of course, have not filed even with the FCC yet. It's one of the things that we're planning on. I do just happen to have what was recently given to the public, and it does say that COMSAT doesn't intend to subcontract programming, but wants to try to keep control of its own programming, so, again, that's still in a tentative planning stage, but that's sort of the direction our thinking is going.

MS. RASH: Thank you, Neil. Jim Alexander?

MR. ALEXANDER: I think we've seen here evidence of the principle that new technologies tend to create new applications, and also a demonstration that the first generation of that new technology, the older technology looks upon as cheaper, faster, more reliable in delivery from what we're already doing. I was especially intrigued with several remarks, but especially Dr. Pelton's remark that by the mid-1980's perhaps a crossover point for additional communications will begin to take over. Many people, I know, have seen the interface of digital technology with the satellite technology as really creating a whole host of things that we haven't seen yet. I'm sure that you've given a lot of thought to that subject or you wouldn't have made the remarks. I'm wondering if maybe I can press for a little bit more for you to spell out what you see coming.

MS. RASH: Did everyone hear the question?

DR. PELTON: I'll make up a question. Being on the panel this morning sort of reminds me of talking to Foreign Minister Romulo of the Phillipines who is a man of short stature physically, but enormous stature internationally, and he was telling me about once being on a panel in Texas with three giants, as he put it, and he said he was intimidated at first, but then he remembered something that allowed him to get through, and he said that he just kept thinking that he was a dime among a bowl of nickels.

Anyway, to respond to the question about the digital revolution that I alluded to, and I do think that it is, indeed, coming and coming very rapidly and does present a number of difficult choices for systems. SBS has definitely decided to go into the digital mode and to broadcast digital mode and is true multipoint to multipoint system which is really one of the first true applications of the capabilities of satellites. In effect, when satellites came along, they emulated the technology that had preceded it, submarine cables. So there's really two aspects of this development.

One is the efficiencies that digital communications can bring, and NASA has done some studies recently or had them done by Western Union Aerospace which projects that the efficiencies that digital and digital compression techniques can bring are like in the order of at least an order of magnitude. In other words, you can get ten times greater efficiency ultimately from transmission modes using the digital technique. But the other aspect which perhaps has not been emphasized as much, and Professor Abramson who is here at the conference has done some very interesting work in this area in the

Aloha Network and other systems and other countries, is the idea of broadcasting so that you can truly interconnect a large number of points. With the INTELSAT system, we have a system known as SPADE in the Atlantic Ocean region that allows on a demand assigned basis of up to 50 or so points be interconnected flexibly on demand, and this allows, as you all know, an enormous number of possible interconnections when you get 50 terminals.

But, when we start taking an environment where there are hundreds and even thousands of points, this is the concept that satellites allow enormous opportunities, and the broadcast mode of flexible interconnection of literally millions of possibilities when you get into this number is the real potential of satellite communications that is just now beginning to be realized.

MS. RASH: Thank you. Does Dr. Abramson wish to comment further? Okay.

AUDIENCE: I have a question for Mr. Helm. In your satellite component proposal, are you envisioning using the spot beam technique in highly groovinized areas, or are you planning a pattern of footprint for the entire United States thereby allowing rural activity?

MR. HELM: Okay. We're certainly...excuse me...we're certainly looking at both techniques, and it's in a real technical kind of planning stage. I think when we conceived in our early planning on our direct broadcast system, we very much wanted to include the rural areas, the areas that are now receiving no television, for example, or very limited fringe kinds of services. We feel that that is a market that is long overdue in being served, and we were certainly planning on serving that market.

MS. RASH: Okay. Mr. MacDonald?

MR. MacDONALD: For the entire panel, I'll sneak in two quickies. One, it's been said that this is a marvelously inexpensive system of distribution, but can't we anticipate that as the demand for this service increases and the satellite base is built up that we would see substantial rate increases in the future, and, number two, could the panel make some comment on the move towards this?

MS. RASH: Neil, would you start with that one?

MR. HELM: Well, let me take the second question first, and I'll defer the first one to people who are a little more into the rates, or a little closer than I am. I'm not a lawyer, but a little bit more of an engineer, and I don't get into the rates and offerings as knowledgeably perhaps as the gentleman on my right.

The second question dealt with the higher frequencies, 12 and 14 gigahertz. Certainly, we're going to utilize these frequencies, and they're being utilized right now in Canada. By the way, it was interesting to note that Canada in a recent press release,

they're introducing a direct broadcast demonstration on those frequencies on their recent ANIK satellite that they've launched, and, yes, beyond that, NASA is certainly putting a lot of new emphasis on 20 and 30 gigahertz, and we think that to serve the requirements that are going to be given to us in the eighties and nineties, we're certainly going to have to use all the frequencies allocated, that's 11 and 14, 20 and 30, presently, and maybe more will come out of the WARC and use those frequencies over and over again through numbers of, you know, techniques, of using and reusing frequencies.

We're finding that we're certainly frequency limited in satellites today as opposed to being power-limited as we were in the early days. We're now launching very powerful satellites, and we have the ability to have a lot of power in space, but we're now frequency-limited, so we certainly will use the upper frequencies, so I'll defer that first question now.

DR. PELTON: (inaudible)...it's down consistently every year almost for the last 15 years, and we are expecting a substantial rate reduction next year. Everyone should recognize though, INTELSAT is, in effect, an international cooperative in that we serve 102 countries, and each country, in turn, retails that service within their own country. The United States stacks up very well in terms of the rates that are charged in comparison to other countries, and, certainly, I think one can see that rates for international overseas calls have gone down, and one would expect them to continue to go down for the immediate future.

However, I think that it would be not fair to anybody here to not paint a less than a completely rosy picture of the future. The studies that NASA has done have shown very easily, if their scenario is anywhere near correct, that we could easily saturate the C band, the Ku band, and keep on going on up. The studies that recently were completed projected something like 40 million voice circuits, thousands of video channels, and I think it was something like 40,000 terrabits of data. That's a figure so large that I can't even think of anything to refer to it except in terms of that I recently created. One is called a TIUPIL. A TIUPIL is Total Information Use Per Individual Lifetime, and then a GHIUPD, Global Human Information Use Per Decade, and these rates that we're talking about are sufficiently large that that's what we're talking about.

This is where we get into machines, talking machines, the fact that a human couldn't even use this total amount of capacity, that if we continue that type of explosive growth, we're going to saturate all available frequencies for satellite uses, even with fiber optics on the ground and satellites only taking a percentage of the total. We really have some enormous problems ahead that have yet to be worked out, and those have tremendous cost implications for international and domestic. Frequency limitations really do translate into higher dollar costs.

MR. RAGAN: Well, I think it's important we meet that question head-on, so, as a commerical carrier, I'll meet it head-on. Yes, there will be rate increases, but I think we must

recognize a couple of points. We're in an environment of a general price increase of everything we use and work with in satellite systems, the ones we have now and the ones we're planning in the future, and I would also add we just filed with the Commission a new rate structure. We filed it last Friday, and we think the rate structure is innovative, and there are rate increases involved, but we've tried to structure the tariff, if you will, that we've proposed to mitigate the rate increases. People order exactly the type of transmission service they need, whether they use our uplinks or our downlinks or their own uplinks or downlinks in whatever combination.

I think there's other elements when you look at using the commercial satellite system, and the word is commercial. There are a number of governors on it. This is a highly competitive business, and I think my good friend to my right here will agree to that. It's highly competitive so that has an effect on it, so you're not really just working in a scarcity or a potential scarcity environment. There's also that the rates do go through the regulatory process, but I think to level it straight out, yes, there will be rate increases, but I would like to make one point. The numbers I mentioned to you this morning which I could gather from some of the expressions on the faces I saw that they thought, yeah, that was a pretty expensive way of reaching into a $200 million operation. I'd like to mention that those are the new rates that I am proposing, so there is still a very workable system.

MR. INGLIS: I presume your question meant that we get to the point that the carriers, although nominally in competition, are, in effect, in a monopoly, because there's a limitation where we sweep windfall profits and raise the rates to unconscionable levels, and I think the answer to that is clearly no. I would hope that the competitive factor that Jim Ragan has mentioned here will continue to operate, because I will tell you that if it doesn't, of course, then we expect the regulators to move in, and that's about the worse thing that can happen.

It means that the companies then don't have the incentive to be innovative, to be efficient, and having spent most of my career at RCA in competitive businesses and then having gotten into communications where we're dealing with companies in some cases that are regulated monopolies, no matter how well managed they are, human nature being what it is, you just are not as efficient if you don't have to worry about Jim Ragan's company here cutting price or getting better.

I think that the public is much better served if we can maintain a competitive posture and let rates be determined by competitive factors rather than by regulation. That certainly is the mainstream of thought, I think, in the whole industry now, the Congress, FCC, and so on, but we'll hope that these technical things that are coming along can continue to expand the capacity of the satellite system so that we will continue to have a competitive environment. I'd far prefer that than have the FCC constantly regulating our rates. Now, the other question that Jim has also...is what's going to happen to our cost. Again, whether the prices are determined by

regulation or by competition are going to have to be related to costs. This is another case where you have two factors which are going in opposite directions. You have technology which is constantly reducing the cost in terms of constant dollars, and yet at the same time, you have enormous inflationary pressures that I don't know, I don't think anybody knows how they're going to act in the future.

All I can say in the past is that in the last few years, I think communications has become one of the greatest bargains in our economy, because the rates simply have not gone up anything like inflation. In fact, in many cases, they've come down. It is a bargain. I am sure it's going to be increasingly a bargain in the future, because I think whatever the general inflation is that communications costs will not rise that fast.

MS. RASH: Mr. MacDonald, there are four answers to your question. The gentleman in the front row?

AUDIENCE: NBC, last spring, I believe, asked for a proposal whereby they could send their network programming by satellite. What's been happening at AMERICOM and what's your view on that?

MR. INGLIS: Well, we're in the process of preparing a response to it.

AUDIENCE: When do you think that will be ready?

MR. INGLIS: I'm not sure. I can't give you a specific answer.

AUDIENCE: How about Western Union?

MR. RAGAN: We elected to no-bid.

AUDIENCE: Why?

MR. RAGAN: Was there a question on that?

MS. RASH: The question was why did you elect not to bid.

MR. RAGAN: That was a realistic business decision, and I think that people recognizing the industry and the way the business is going, and we're very, very close with our good friends at NBC, and we do work and talk with them. In fact, when Mr. Inglis can't provide the service they need, they come over, and we do some work for them, but the fact of the matter is we elected to no-bid this round, and we're still talking to them, because we have an interest as RCA AMERICOM does in promoting the use of the satellite and taking the most advantage that can be made of the technology and to grow into some of the things we're talking down the road, so we're certainly not saying no, and cutting off our nose and walking away.

AUDIENCE: A question for Mr. Ragan. What is the status with regard to Western Union's desire to get to the cable operators via the PBS stations?

MR. RAGAN: The question was...in essence, does Western Union desire to get into the cable business, and the answer is obviously we would like to serve the cable industry. I must say that RCA has done, I think, an outstanding job in providing service for that industry and has a very predominant position, and they earned it. As far as working with the PBS, we hope that in the near future there may well be a decision on the PBS sharing issue, and that has a great deal to do with it.

AUDIENCE: How deeply are other nations into the development of satellite systems, and how will that affect what we're doing?

MS. RASH: How deeply are other nations in the business of developing satellites?

DR. PELTON: Well, there are two aspects, at least, of satellite communications, perhaps several more, but one of them is international communications. Today there are 102 countries who are operating via the INTELSAT system. There are also a few countries, the Soviet Union and East Europe, who operate on MOLNIYA or the Soviet Intersputnik system, and, of course, there are also plans for possible regional systems as well, so for international communications, satellites are now predominant. INTELSAT carries approximately 60 to 70 percent of all overseas international telecommunications and virtually all live television broadcasting.

As to domestic services, there are today some 16 countries who are operational on the INTELSAT system for domestic communications. Algeria was one of the first. There are a number of other countries. Typically, these systems have leased one transponder or more to connect their regional capitals, and making, I think, a rather enormous impact. In Algeria, for instance, it was interesting that these go basically to regional desert areas in the Sahara, and it's always been a lifelong tradition that market started at sunrise and closed at sunset. Now, the market closes at 5 p.m., because that's when the TV comes up, so a century-old tradition was broken by the advent of satellite television in Algeria.

There is no doubt that satellite communications is a worldwide phenomenon, and many countries are very advanced in this techology, particularly in Europe and in Japan. INTELSAT will be using the Ariane launch vehicle which is a European space agency for at least some of our launches with the INTELSAT V, and in the INTELSAT V program, about 20 percent of the subcontracts are for industry in Europe and Japan, so it certainly is a worldwide phenomenon, and the penetration is happening very, very rapidly.

MR. RAGAN: Perhaps I can also add one small comment. In the area of broadcast satellites, people think that ours was such a novel introduction, but certainly we're following... Canada, as I said, has already announced the service and, again, will beat the United

States in this kind of a service to its people. Japan has a broadcast satellite that it's going to launch in the near future. Europe is presently building a broadcast satellite. The Scandanavian countries are a couple of years down the planning road on the broadcast satellite. I said Europe and Germany have broadcast satellites, planning and design and building stages, so it's certainly these other nations are working with new technologies and sophisticated technologies, and, in many respects, they're ahead of what we're doing in the United States

MS. RASH: Okay. Time is running short. Let's take one brief question from this side and one from this side.

AUDIENCE: One of the things that should affect cost would be the rapid transmission and storage systems, cost to the user. How well developed have these been?

MS. RASH: Is your question for any member of the panel who wishes to answer?

AUDIENCE: I suppose particularly the person who spoke about digital transmission.

DR. PELTON: Could you just clarify exactly what types of storage?

AUDIENCE: I was thinking of the one that Peter Goldmark had developed. I know that it was said that you could send a whole day's programming during a commercial time, for instance, and that should cut cost to users, time cost to users, if that's really developed.

DR. PELTON: Well, I'm not sure that I am the right one to respond to your question. Certainly, there are all sorts of things that are coming, shared usage in Europe and coming in the U.S., teletex systems where one will be able to send out information to homes electronically on television that can be combined with electronic mail type of home to user services. There is, I think, a fairly wide consensus that in Europe and in the U.S. that one will see sometime in the eighties or nineties timeframe, something like a home video and telecommunications center that can be used for everything from paying bills, electronic mails, accessing libraries, and a storage of information.

The potential for storage of information is truly enormous. Many new technologies are being developed. Phillips has developed a video disc type of technology for data storage that can store up to ten billion bits of information one disc. The memory capabilities with double memory, polygraphic type systems that are underdeveloped will be able to store all information that we can conceive of at very low cost, and certainly what is happening in the so-called information societies...U.S., Japan, Europe... is a combination of computer technology and information technology, and it's my prediction that this technology base will extend to include the energy fields as well. In fact, those of you who follow closely some trends in industry will notice that some of the very large corporations who have a basic technology, a silicon chip technology,

are very heavily involved in communications, heavily involved in computer, and increasingly involved in energy technology.

MS. RASH: We'll take one final question from this side of the room.

AUDIENCE: Yes, this is for the two satellite carriers. Some of the members of this Consortium occasionally could have a return link, voice link. We might visualize that might occur on some religious programming on a regional basis or in educational programming. I don't know if you have seen that requirement, but if you have, how are you currently responding and helping these managers plan this return link which might come through on terrestrial service as opposed to satellite?

MR. RAGAN: Let me answer it very quickly in two ways. The way we respond, and we have when a requirement is placed on it, it generally becomes a trafficking requirement, we go from here to there, and how do you want to return. Just on the Western Union system, let me make the point that we have the three satellites. We have the seven television and radio earth stations, and another major earth station for our message traffic. We have a cross-country up to 9 or 10,000 mile terrestrial microwave system, so what I'm really saying is that once we say the traffic, there's many ways we can traffic the pattern.

I'm sure in the number of sales conventions that we've seen and the telethons, we had a soybean arrangement, the Robert Wold Company out of Atlanta that was international that we have, in fact, done exactly what you say. I'd be surprised if we haven't, so I guess my answer is, it's a trafficking question, and I believe we've done it.

MR. INGLIS: I would give the same response. I think every case represents a different situation. You have to compare the cost of terrestrial circuits with the satellite. You have to...it depends on whether there are earth stations nearby that you can use, so I couldn't give a general answer, except that every case is a special one.

MS. RASH: Ladies and gentlemen, this concludes our morning session. Please check the message board. There are several messages marked urgent there. We reconvene at 2 p.m. in this room.

(Applause.)

(Whereupon, the conference adjourned to reconvene at 2:00 p.m., this same day.)

Remarks
By

Dr. Elizabeth Young
President
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

DR. YOUNG: We'll begin our session as soon as possible. We are running just a little bit late. Welcome to some of you who, perhaps, came in late in the morning and have just registered and are joining us for our first session. Welcome back to those of you who were here for what we hope and felt were two very interesting sessions this morning.

I take a great deal of pleasure, although I must say I have some mixed feelings about introducing our main speaker this afternoon. The pleasure is because I even preceded him at the Corporation for Public Broadcasting. I worked for the organization when the main headquarters office was in New York City, and there were about 12 of us rattling around in rented quarters there, and then eventually moved down to what was then a block up from the White House on 16th Street.

The Corporation has moved since then two blocks north. I don't know if that's an indication of any kind of political move or not, but the quarters are very much nicer now, Bob.

The reason I have some mixed feelings about it is that there are three words in the introduction to Robben Fleming which, up until a few months ago, I was not allowed to say, and those three words were University of Michigan. As some of you know, I spent three years at Ohio State, and we used to refer to it as the state up north and the university up north. We were never allowed to use the colors blue and gold, much less . . .let alone utter the name.

But since Bob and I are now in Washington, I think it's safe to do so. In any event, many of you know and are familiar with the work and the background, and the distinguished profession of our speaker this afternoon, Robben Fleming. He has been the President of the Corporation for Public Broadcasting since January of this year, elected by the Board after what was surely one of the most intensive and broad-reaching searches in the history of any public organization.

Mr. Fleming comes to us with a background not only as a university administrator, President of the University of Michigan, and formerly at the University of Wisconsin, but with a distinguished career in labor law. In 1966, his work in labor relations led to his selection as President of the National Academy of Arbitrators.

It's been my privilege in the four months that I've been back in Washington to get to know Bob a little bit in our professional dealings, and I'm happy to say that I think one of the thrusts that the Corporation is now taking is a very much welcomed one, particularly to the constituency of the PSSC. While the title "Broadcasting," is clearly foremost in the Corporation for Public Broadcasting's name, I think we all realize now that the media have grown up, and that there are beneficial overlaps between broadcast and nonbroadcast technologies, between information, public service, entertainment and education.

It has been my view in my discussions with members of the staff of the Corporation and, indeed, with Bob himself that the Board and the staff are now taking a broad look at how the Corporation for Public Broadcasting can truly service the public in a variety of ways, and those are not limited exclusively to over-the-air broadcast stations, although that constituency remains certainly the prime concern of the corporation. But the whole realm of education, the whole realm of ways in which we entitle people to receive public services now I think falls under the purview of the Corporation. And so it grows and expands its mission, we see a continuing and, indeed, a closer relationship with the Public Service Satellite Consortium and the public service sector.

Mr. Fleming has titled his talk today "Broadening the Mission: the Next Five Years," and it's my pleasure to introduce him to you now.

Broadening the Mission:
The Next Five Years
By

Robben W. Fleming
President
Corporation for Public Broadcasting

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Liz. When Liz asked me to come over and talk today, I was glad to do it because I think the satellite, in all its implications for the whole public broadcasting arena, is a very important one.

At the same time, I'm acutely conscious that this is very much like carrying coals to Newcastle. I look around this room and see so many faces of people who know a great deal more than I do about this whole subject, that there is a certain chutzpah, I suppose, about my coming and talking to you about this subject.

Nevertheless, it's never been a qualification for making a public speech that one had to know something about the subject. And on that score, therefore, I come to you extremely well-prepared, and I am glad to come and talk.

I am going to talk briefly about three aspects of the satellite which, from the standpoint of some of the CPB operations I find interesting, and I suppose in that connection, I should say that I really am speaking for myself at this point because the things that I'm going to talk about are not the product of the Board's having considered them and decided that these were three things that they wanted to be particularly interested in. It's simply that as I have talked to many of you and looked around this area, it seems to me here are three areas in which the satellite has clear implications and which will cause us to take some kind of action one way or the other within the course of the coming months.

And I'm not really going to talk about the technological side of it, partly because there are people, including our own Phil Rubin who is here and who many of you know, who know that area so much better than I do, that it would be folly for me to engage in that. So these are essentially three rather broad policy areas in which there are implications for us.

The first is what I would call the linkage problem and by that, I mean the linkage between producers and viewers, and in the nonbroadcast sense now. The second

is whether and what kinds of implications it has for such programming as CPB ought to be interested in, in the field of education. And the third is to talk a few minutes about the kind of discussions which I now find going on with respect to whether there ought to be a linkage between public broadcasting or public programs and a sort of pay-as-you-go system in aid of financing the overall program development field.

Now let me take those three things and talk a little bit about each one. Now, you're aware, all of you, that one of the mandates that CPB has is to look after some of the interests and involve so-called independent producers. That conversation has related primarily to television, but not wholly. It has its carry over into radio and my own exposure suggests that while it's not as vigorous a subject of conversation in the radio area as it is in television. It does extend to both, and you'll remember that in the discussions before the Congress with respect to independent producers, CPB is told with varying degrees of specificity, depending upon whether you are an independent producer and would like it to be read as quite specific, or whether you are a programmer who would like to read it as a little more general. In any event, I think everybody agrees that there was a great deal of talk at the time the 1978 Act as adopted about financing the productions of independent producers, and that CPB was to allocate some of its resources to this purpose.

And so that is a problem which the Board has before it, and which we must do something about. The problem, of course, as you know better than I in trying to decide what you're going to do with independent producers is at the very outset to define what is an independent producer because you get everything from the Children's Television Workshop, for instance, which in the sense of not being affiliated with a station, is an independent workshop to the small individual operator who has essentially a camera and a tape recorder, and all stations inbetween. And it's made more complex because within those categories of independent producers there are minority groups, women's groups, and Hispanic groups and all kinds of groups which envision some, perhaps, differential treatment in terms of the work they do.

From the CBP standpoint, since we are permitted under the law to finance the production of programs, but we have no facility for showing them. . .they're all in the hands of the station or in whatever nonbroadcast techniques one finds. So that gives rise to a question: If we are supposed to allocate certain amounts of money for independent producers, how do we best do that because a prudent business judgment, kind of judgment which the Act speaks about would suggest that you don't particularly want to finance the production of programs without any way of knowing whether they're ever going to be shown in some fashion.

And so I would assume, exercising a prudent business judgment on our part that when we finance independent productions, one of the things that we ought to be interested in is, what is the probability that that's going to be shown. Now, obviously that can be worked out through broadcast techniques, by working with the stations, by working with PBS and so forth.

We have, however, another mandate, and that's where the satellite linkage comes up. We're told that one of the things that we're supposed to be doing is to encourage the use of nonbroadcast dissemination of materials. Now, if we're going to do both of those things. . . that is, on the one hand, encourage independent producers and on the other hand, encourage the use of nonbroadcast techniques, the question then arises, should we try to work out some linkage between some independent producers and nonbroadcast techniques. Specifically, should we try there being spare time on the satellite, which obviously you're using through PSSC, through which some other kinds of programs have been put on such as the anti-nuclear demonstration here in Washington in which that group of independent producers purchased time on the satellite and showed that program, and then I believe there was the abortion conventions in Cincinnati, pro and con, which were shown through that same kind of a meeting. Should we, therefore, say, well, one possibility for CPB in a sense to kill two birds with one stone, is to link up our mandate, on the one hand to encourage the use of nonbroadcast techniques. . . in this case, the satellite, and then linkage through cable systems with the independent producers and try, in that fashion, to carry out our function of helping to fund some productions of that kind while at the same time ensuring that there would be dissemination and would be viewing?

Now, if we do that, I am not sure that would be met with overwhelming enthusiasm on the part of stations because it would be obviously utilizing a method other than the traditional broadcast method. On the other hand, that can't be a complete deterrent to us because we are told directly that one of the things that we're supposed to do is encourage the use of nonbroadcast techniques.

So what I'm saying, in substance, is that now that the satellites are in place and it's clear that there are going to be other satellites in the future, not just replacements of those that are up now and which may expire in a period of ten years, but for other reasons and there are entreprenurial interests in putting up additional satellites, as you well know, at this point in time; therefore, given the fact that the satellite is there, given the fact that there is time on it, given the fact that we have this mandate with respect to independent producers, given the fact that there are cable linkups with the satellites, should we now explore whether or not there isn't some way in which we should try to put those two things together and carry out some of our functions?

And I think that you can assume that the answer is, yes, that we will explore that. I don't know what the answer to it is. Some of our people who are more knowledgeable than I will certainly know more about some of the problems than I do, but if you just ask the question: Should we explore that? It seems to me the answer is clearly yes, and I would assume that we will be doing that in these next few months.

Let me move to a second area: The role of of CPB in education. It's well known that when the talk. . . when there was first talk of public broadcasting, and going far back beyond the t.v. days, particularly when so many of the stations are owned and operated by universities, that there has always been a feeling that both radio and television should be used in connection with education. And as we all know, it is heavily used in many areas. Some states literally devote much of the daytime hours to educational purposes. I'm talking about instructional purposes when I say that at the moment.

So there has always been that particular role open. There has always been, to my knowledge also, a certain amount of both criticism and dissatisfaction with the way all of us in public broadcasting play that role: That is, there is a criticism that we don't do it adequately; that we have never entirely measured up to what the public might expect from us, and so forth. And so one of the things that CPB has to ask itself at this point in time is what role should CPB be playing in the educational area? And if you're knowledgeable about education, you shortly say to yourself, "Well, look, if we put the entire budget of CPB now in 1980 at $152 million into the field of education," knowing the amount of this nation's gross national product that goes into education, you would hardly make a ripple in the pond because that would be so small a portion of the total amount of money devoted to education.

Therefore, it seems to me one of the things you have to conclude very early in the game if CPB is to play any role in this, is that it's going to have to be very selective. It would not have enough money under any conceivable set of circumstances that you can imagine to play a major role in education in the public broadcasting arena. But it could play a significant role, I suggest to you, in at least two areas: one of which it has long been active in, which is children's programming, and there you are talking obviously about pooling funds of such an investment as CPB might make in it, along with investments from other governmental agencies, with school districts and so forth. That is one area where I think the record will show that the investment of CPB monies has had an influence on children's programming in this country. And the other. . . and would continue to have, if you continued to invest money there. And the other is in the whole area of higher education. It's very observable these days that institutions of higher education are growing increasingly active in the broadcast of educational programs, whether it be on television or radio. And from the economic standpoint, surely it has to involve both of those media because there is no way that I can see that one

could resort wholly, let's say, to t.v. Certainly, that's not been the experience elsewhere when you try and do that.

So suppose you said, "Well, CPB ought now, with the coming of the satellite," there is a difference because before with a single channel, when educational programs were put on, they always had to bump something or you had to put them on, let them be recorded then and put on video tape and then you play them back at another turn. Now, with the coming of the satellite, that's not necessary any longer. And, therefore, one of the things, as you all know, that PBS is considering, for instance, is at least three channels, three different ways of conveying programs. And while presumably given the efficiency of taping off many of those programs that one would pick off the satellite, and then replaying them because that fits into the instruction scheme. . . presumably that's probably what you would still do. . . nevertheless, the fact that there is now available a much greater potentiality for showing those programs, making them available than there ever has been before, that alone is going to be a significant new incentive.

But suppose that there were money which CPB could put into higher education, how would it use such money to be useful? It has no stations. It has no power itself to produce programs. That is, CPB as such does not produce programs. What could you do?

Well, if you had money, it would seem to me, knowing what I know about a university and knowing what I know about the costs of the university, and how you could most effectively use money, that probably the best thing you could do would be to invest that money in collaboration with universities and colleges in the production of quality courses, and you'd have to agree upon a set of conditions as to how you were going to do that. But if it were possible for us by the investment of X-amount of dollars to help produce quality courses which might then fit into an overall university curriculum. . . I'm thinking essentially undergraduate which would, at the disposition of various colleges and universities, help lead to an external degree, you might very well make an impact that would be lasting. I've talked to enough people who are intimately involved in that game to know that an investment of that kind of money on our part could make a significant difference. There is an area which, it seems to me, clearly will be explored, and the thing that's given it the greatest impetus is the existence of the satellite.

Let me turn finally then to question three about, what in a sense I have called pay-as-you-go public t.v. If one looks ahead at the financial problems of public broadcasting in the next few years, by which I mean the next two or three years because that's about as far ahead as the appropriations run at the moment, what you see after 1980 is increments under the present budgetary scheme

of about $10 million additional coming in each of the next two years after that. Now, $10 million is not enough money, given the present rate of inflation, to even hold your position vis-a-vis inflation. The dollars that you would get two years from now, even with that additional increment, would not keep you even with where you are now.

Beyond that, there are additional problems. One of those problems is when CPB financed the satellite system, it paid for a large share of it, but not all of it and, therefore, is having to pay off the borrowing which it undertook to pay the balance of that. And for a lot of reasons I won't go into here, unless you want me to at some point, CPB must pay itself back, in effect, out of the incoming appropriations in order to get that satellite debt paid off because the only real source of income we have at the moment is the appropriation. And since we, in a sense, are in a deficit position because of that financing, we've got to pay ourselves back. If we pay ourselves back, that will take a chunk right off the top of that $10 million before you ever get to inflation.

Therefore, the financial picture viewed from the standpoint of federal financing of public broadcasting in the next two or three years is pretty dim, and it's not likely to change very much given all the other demands upon federal monies and the President and probably the likelihood that any successor president will feel equally that they've got to control the federal budget. So that prospect is not very bright.

That was doubtless part of the reason why you saw in the Van Deerlin bill this year new efforts to find a way to finance public broadcasting. And you will remember that in that bill was the proposed spectrum fee, the proposed appropriation tied to $1.50 per capita in this country which would have produced about $300 million for public broadcasting instead of $152 million. And the suggestion that there might be a limited amount of advertising permitted on public broadcasting. And you know that for all practical purposes, that bill has been shot down. That is, though something may happen in the field of broadcasting before this current session is over, it will not have to do with any of those things. And therefore, those kinds of proposals. . . none of which met with wild enthusiasm, I must say, are not going to eventuate as a way of financing this. And, therefore, there's not much reason to be optimistic that in the course of the next two or three years, if you're relying on appropriations, that the financial situation is now going to improve.

That brings you then to the point of what further can be done by public broadcasting on its own initiative in order to finance in this case, let's say, programming because in our case, at least, at CPB, one of our biggest interests insofar as we could affect it, would be to enhance the program monies because that's probably the principal reason we exist is to try to provide money for

program purposes, and that programming will get more expensive all the time, too. So you say to yourself, well, should all of us in public broadcasting be examining the possibility now of a linkage which would make available certain kinds of programming prepared for public broadcasting to cable systems which, in turn, would, of course, charge those who used the cable to receive it, and which might then have an interest in dividing that fee so that it received part, but that it paid for the programming? And that that money came back into a pool which could then be used for further programming in public broadcasting?

Now, the technology is such that, with the scrambler which I understand can be put on the receiving devices these days, you can only receive that program if you paid off the cable if you have the scrambler on your set or on your receiver, so that not everybody would and could receive the program that came in this fashion.

If you did that, it would raise a lot of questions again. It would surely raise a whole set of questions with respect to rights in television programs and I think nobody really knows the answer to that question. It would raise questions with respect to broadcasters because it wouldn't necessarily have to be done through broadcasting methods. It could be done direct. We all know that technology is such these days that you can put a small dish on the roof, that that project is coming along to the point where, before very long, it would be feasible to receive directly off the satellite. So it could have an impact upon broadcasting stations if that were done, and that would lead you back into the question from our standpoint of our obligation to encourage means other than direct broadcast.

Well, that is the end of what I want to say about it. I think it's reasonably evident that the existence of the satellite and the many alternative ways it now has of bringing programming is going to change the world of the receiver in a great many ways, and I think it's going to involve adjustments for everybody in the industry. It will bring on some new tensions in the industry because it will set up one more competing group, of which there are already a good many. But the one thing about it I think you can say is that it's going to be exciting. Thank you.

Questions and Answers
by

Robben W. Fleming
President
Corporation for Public Broadcasting

Fourth Annual Conference
Public Service Satellite Consortium

DR. YOUNG: Mr. Fleming will take a limited number of questions for perhaps five or six minutes, if there are some, and then we do have a slide presentation that we'd like to show you that we've done for our member, National Public Radio. Are there questions from the floor? Yes, right here.

AUDIENCE: The new PBS arrangement of three channels that you mentioned early on in your presentation, will provide three channels outgoing from PBS but they'll still be coming into stations that only have one channel to distribute programs on. Would you comment on how that's going to affect the ratio of educational programs to the general program schedule, and what that says about other kinds of distribution?

MR. FLEMING: Well, Hartford Gunn, sitting back there, who spends a lot of time thinking about these questions, and I'm sure can answer better than I can. But I assume -- and Hartford, you can correct this or not -- I have assumed that, while it's quite true that you may have only one channel to transmit, that you could be simultaneously recording one program and putting it on videotape with your machinery, and then either making it available on videotape or simply transmitting it at another time when you were willing to interrupt what was coming off the satellite.

(Discussion between Mr. Gunn and member of the audience.)

DR. YOUNG: You've just been hearing from Hartford Gunn, Vice-Chairman of the Board of the Public Broadcasting System. Are there other questions? Here in the front row?

AUDIENCE: I thought the scenario you spelled out about transmitting programs that are, in turn, carried by cables which are sent to somebody, for instance, the scrambler, funds to which are shared with cable company and producer. . . the question is, is that now prohibited and, if so, is that prohibition extended to ITFS stations?

MR. FLEMING: I can't answer the second one. The first part of it, I believe it does require a change in the rules. Some of you know more about that, again, than I do, but I believe it does require some change in the present rules.

AUDIENCE: FCC rules?

MR. FLEMING: I think so. Does anybody here know that answer definitely? My impression is, it does.

DR. YOUNG: Well, if I understand the question, if you're asking if programs can now be fed via satellite to cable unscrambled, the answer is yes, and there are cable systems which are, of course, charging for programs, whether it's entertainment programming or educational programming.

AUDIENCE: So they can charge? That's what I —

DR. YOUNG: Oh, yes, yes.

AUDIENCE: To be more specific, can an ITFS station transmit a signal to a cable, not necessarily by satellite. . . just go to a cable company who can then charge its customers for that extra channel and then the revenue from that be shared between the cable company and the producer.

DR. YOUNG: Certainly what you've outlined would seem possible, absent any problems with copyright or contractual negotiations with an originating producer or originating point of entry into that system. Are there other questions for Mr. Fleming? We've gotone in the back here, and then the gentleman in the front row.

AUDIENCE: Assuming that pay television, commercial pay television industry is more efficient at producing and distributing programming by means of a pay system, what would the Corporation for Public Broadcasting. . . what kinds of programs would they have to continue to supply that the market would not supply?

MR. FLEMING: Well, I'm not sure that the companies that wanted to operate this way would be very interested in operating directly with CPB. I think it more likely that they'll be interested in approaching individual stations which produce and PBS. But the point would be, I think, that I can foresee a time when a program proposal comes in and attached to the program proposal is a provision having to do with the rights for the use of the production once completed which would say, and the intention is, that this program would at some point be made available also for use by the satellite and use in the cable companies, and that there would be fees being returned. And I suspect that we might, at CPB, then say, well, if that is to be done, and in order for us to invest in it. . . and

we might, in fact, want to encourage that . . . in order for us to invest, we want to see that that money comes back into programming for other and additional programs because just as the cable companies need programming in order to operate, all of us in public broadcasting need money in order to produce programs and we all know that we haven't got enough.

So you'd only do it in the first place, presumably, because your incentive was to, in the absence of more and more appropriated funds, that you'd be trying to raise money which you could, in turn, reinvest in programming.

I suspect it has a lot of complications, and all I'm suggesting at this point is that that will surely be a question which will get raised, and I think get raised rather quickly.

DR. YOUNG: Other questions? If not, Bob, we want to thank you very much for being with us today.

MR. FLEMING: Thank you. Good to see you.

Remarks
by

Dr. Elizabeth Young
President
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

Earlier this year, one of the PSSC members who is certainly looking toward uses of satellites and, indeed, has now activated its system, National Public Radio, came to PSSC and indicated an interest in a partnership that resulted in the production of a slide show which you're about to see. This program is also available on video cassette for any of you who might be interested in using it with your own organizations.

The NPR satellite system will be capable of many types of distribution and, indeed, is a unique system. One of the areas that NPR has been interested in for some time because, in turn, its stations are interested is the use of subcarriers for specialized programming, most notably to the print handicapped. And so the slide show that you're about to see titled "The Future" speaks to that point.

SLIDE SHOW

(Music) In the beginning, there was man, living in a hostile environment, alone or in family units. People soon learned the value of living and traveling in small groups. As this community grew, so the need to communicate ideas, information, and goals among the members emerged and developed.

Early forms of communication may have been hand signals, grunts, or both. Eventually ideas and desires, wants and needs became words, and words became verbal language. As the need to communicate grew more complex, so did the capability to communicate. Smoke signals, runners or drums may have been early forms of communication over long distances, depending upon the environment.

As this community grew and prospered, traded and traveled, so did the development of a written language. For centuries, written language remained the only reliable means of communication over great distances. It wasn't until the early Nineteenth Century and the discovery of electricity, that the ability to communicate took the quantum leap that brought it into its present form.

Franklin, Edison, Bell and many others started us on our long journey into the age of electronic communication. By the early Twentieth Century, our capability had reached such proportions that trans-continental communication became possible via telegraph at the flick of the key.

The telephone brought the opportunity to actually send one's voice over great distances and to hear instantaneous response. What an accomplishment! But nothing compared to what was to come. In a mere seventy years or so, we have invented tools with the ability to send words and pictures around the world, and even to and from the moon.

As the usual of visual communication expanded, the alternative methods declined. Television eventually changed the once informative and educational production of radio into a secondary entertainment medium. There was also a decline in the publication of national and local printed matters such as newspapers, newsletters and magazines.

The written word no longer remained the primary source for conveying information and news. Although we have the technology available for world-wide communication, there was still a segment of our population unable to realize the full benefit of these new advances. The increased use of television and the electronic media had not been applied to meet the needs of the print handicapped, that portion of society unable to use printed materials because of a visual or physical handicap.

The first attempt at mass communication specifically for the print handicapped was that of a tactile alphabet invented by Louis Braille. More recently, the advent of copying books on disks and later on magnetic tapes provided the print handicapped with materials received in joy, and allowed participation without the assistance of sighted people. However, the immediacy of instant news and the technological aids that other portions of the population enjoyed was still lacking for the print handicapped.

Fortunately, in 1955, the Federal Communications Commission published a subsidiary communication authorization, and created an entirely new broadcast vehicle. In 1960, it was satisfactorily proven to the FCC that non-commercial public radio had a growing need for the auxiliary services made possible by the authorization. In February of 1961, the FCC authorized FCA operation by public FM stations in a manner compatible with their noncommercial status.

In the late 1960's the first radio reading service went on the air on an FCA subchannel. The Minnesota Radio Copying Book provided the reading of daily newspapers, magazines, and current best-selling novels not available in other forms. People who were partially sighted, totally blind or others who had problems reading the printed word were aided by this new service.

The intent was not to replace Braille or the more recent copying books, but rather to complement those services. Its purpose, like theirs, is reading, and it emphasizes two of radio's great strengths. . . its immediacy and its localism. This is a service which augments the existing library services to the blind and physically handicapped person. With an updated capacity, it permits the reading of newspapers the day they are published and magazines when they hit the newsstands.

In addition, the print handicapped are able to enjoy many current books and other works of a creative timely nature which have not been made available in Braille or recorded form. Although the customary form of radio broadcasting, the AM and FM bands could be used to broadcast radio reading services, the subsidiary communications authorization provided some definite advantages and benefits that enhanced the traditional reading services for the print handicapped.

Copyright waivers were allowed so that copyrighted material and syndicated newspaper articles could be read. Some radio reading service is being transmitted on open channel FM stations. However, because of the unique authority granted by the FCA, the use of subchannel transmission provides less restrictive programming for the print handicapped. According to the FCC definition, FCA transmission is not a broadcast function, but rather a private point-to-point communication.

Current use of FCA and the radio reading service provides many benefits to the print handicapped. The mainstay of radio reading services has always been the reading of daily newspapers. Public radio and the association of radio reading services both recognize the importance of this broadcast media, and both have a desire to help on a nation-wide level to provide assistance and programming expertise, and have the commitment to help in the continued technical development of FCA transmission for the print handicapped and the radio reading service.

Today, National Public Radio is in the process of setting up a national distribution network via satellite with an operational date by early 1980. The technical capability is available to allow transmission of FCA and radio reading service programming, be it the future network. There are over 150 National Public Radio stations across the country which are potential or existing radio reading service outlets.

What is the benefit of a closely working relationship between radio reading services and the National Public Radio and its satellite network? How can the needs of the print handicapped community best be met through such cooperative efforts? Initially by providing greater access to the Association of Radio Reading Services Programming through national distribution. This means a potential growth of additional NPR-ARRF broadcasting locations. And effective, efficient network can mean rapid distribution of timely programs for the print handicapped community.

Saving through shared revenues and shared costs can mean a potential for improved programming and greater productions with abilities. It can allow for increased interaction between ARRF stations on a regional or national basis. Perhaps it can provide regional or national talk-back programs with legislators or business and community leaders. It could incorporate new electronics, and encourage new developments to aid other members of the disabled community. It could provide local channel programming to include the possibility of recording one or two programs while airing another. It has the potential of providing automated programming to allow taping of future programs during the evening hours when personnel would not be needed to operate the equipment.

It's a world of possibilities that can further the involvement and enrichment of the print handicapped member of our community. And certainly the formation of a National Radio Reading Service for the print handicapped can help augment the importance of the local radio reading service within the local community. And although the development of electronic communication has greatly reduced the size of our world, the future holds an even larger, ever expanding world of communication for the print handicapped.

This presentation has been produced by the Public Service Satellite Consortium for National Public Radio. Funding has been provided by the Corporation for Public Broadcasting.

Remarks
by

Dr. Elizabeth Young
President
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

We started our day today getting the perspective of at least one portion of federal government, specifically the House Subcommittee on Communications in terms of where they saw telecommunications and telecommunications policy moving. We then heard from four of the dominant carriers in the field with most interesting presentations and some looks toward the future.

This afternoon, of course, we've heard from Robben Fleming, President of the Corporation for Public Broadcasting, a private, non-profit entity, that is heavily engaged in providing programs and services for the public sector. And now this afternoon, we're going to hear from two gentlemen who bring a unique perspective to the field because their agencies have been mentioned throughout the morning and the afternoon. They are William Lucas, Associate Administrator of NTIA, the National Telecommunications and Information Administration, a relatively new agency under the Department of Commerce that pulled together a number of strands of telecommunications policy and operating agencies from within government, followed by Donald Dement, who is manager of the Advanced Communications Division of NASA and works here at the NASA Headquarters.

They are two of the key players on the governmental side, and two people with whom we work very closely and very pleasurably. We'll hear first from Bill who will speak to us about a public policy on public service satellite communications.

The first time I met Bill was when I was in Columbus, Ohio, and the Warner Qube System was very new, and he was coming out to inform many of us in education and public broadcasting about what had been done with an interactive cable system in Spartenburg, South Carolina. Bill had been intimately involved with that because during the 1972 to '78 period, he was the senior research scientists for the Rand Corporation. Bill has his Ph.D. from the University of North Carolina in political science and, as I mentioned, is now in charge of the telecommunications applications sections of NTIA.

It gives me great pleasure to introduce to you Bill Lucas.

What's Coming Next?
By

William Lucas
Associate Administrator

Fourth Annual Conference
Public Service Satellite Consortium

My talk is billed "What's Coming Next?" Mostly NASA. Don Dement is next. He told me he was really ready to send you a message so I will be brief, particularly since he's been the Big Daddy in the field. I say that as sort of the new kid on the block, NTIA.

When we came into all of this back in, oh, long ago. . . March of 1978. . . there was clearly a lot that had been going on. NASA had stimulated a lot of R&D. The commercial sector had responded and done an awful lot on its own. After Early Bird and the successor satellites, we had a remarkably mature, robust and even profitable industry that was up there. Nonetheless, people were screaming in the community that we sought to represent and serve.

Basically the problem was that, despite the effectiveness and efficiency of the satellites, they were only effective and efficient if your basic purpose was trupking communications. If you wanted to place a telephone call from New York to Los Angeles, my goodness, what a wonderful thing the satellite was. If you, however, were a doctor or a senior nurse at a remote Veterans' Administration Hospital in some remote corner of the state, it hadn't done you any good at all. If you were in a voc rehab clinic in northeast Arkansas, as one of my favorite examples. . . I happen to know where there is one up there. . . and you wanted to transmit data or get hold of improved training materials, the satellites still hadn't helped much. It was the old familiar problem of not enough power in the sky to serve small earth stations.

We didn't get hung up on the question of small, but we were concerned about the question of cost. The mandate then, it seemed to us, was to do something about the low volume communications user, the user of communications that had some video. . . a couple of hours here and there of training, some data perhaps to push around, but not the kind of large volumes of communications that seem to lend themselves quite admirably to trunking satellite systems.

About the time we got involved, we got into the saga of SYNCOM IV. I recognize some familiar faces around here, Joe Sivo of NASA, in addition to Don, was one of the actors in that lovely game.

Incidentally, parenthetical expression, for those of you that were at EAST-COM this morning, where I went over almost exactly the same ground, please turn off your hearing aids for the next few minutes.

Hughes Aircraft Corporation came in. . . Satellite Corporation. . . came in with a very interesting offer to the Federal government to launch a satellite that would be providing services possibly to the Veterans' Administration, AID and to other agencies. The agencies went into kind of a frenzied form of paralysis where we tried to sort out just how one would respond to all of that. Some very able and very capable people pulled together an ad hoc interagency committee to try to deal with that, and one of the things that was done early on is NASA, in order to serve this ad hoc committee, did a request for information among the industries.

From that, and from the ensuing history of SYNCOM IV, we learned a lot of different things, but three very central lessons. First of all that video was already attractive, the economics were already kind of interesting particularly with the growth of cable systems, but using the satellite for primary distribution and then cable or ITFS or public broadcasting or some other vehicle for the secondary distribution once you got it back on the ground, a lot to be done.

Secondly, that the kind of interactive video or even interactive narrow-band. . . voice, slow speed data communications requirements . . . that many of us thought were essential in the near term to more effective higher quality public services were not going to be enabled by any satellite that we saw on any drawing board anywhere in the United States by any corporation. They just weren't coming down the pike.

Third, we learned that the Federal government was totally and completely unable to respond to a straight-forward prudent offer by a private sector firm. Part of these reasons are very understandable. Long-range planning. . . do you know in three months, I will put to bed my planning for the FY'82 budget? It's hard to respond in a hurry to these kinds of things, but more than that, there was no clear mechanism for combined interagency planning. Well, somewhere along the line, we changed the interagency committee for satellite telecommunications applications into a formal body -- ICSTA, ICSTA. I found that, you put together the 12 letters: Z, Q, R, T, 2, 117, 6Z, and NASA can pronounce it.

Our good colleagues who have been at NASA who have been the mainstay of this agency quickly called it ICSTA, and that is how it's now been dubbed. This, hopefully, was going to be the new organizational mechanism to try to bring together federal procurement and, to a degree, state and local and even private nonprofit procurement of public service satellite communications.

It was clear to us a couple of things were necessary, some out of political necessity; some out of just common sense; some out of sort of predominant philosophy that the Federal government operates. First, we were not looking forward to a new NASA satellite. That is to say, some people are looking forward to having one, but this particular community was not going to plan on the use of a NASA satellite for an operational service.

A lot of people felt that the free-ride mentality that had grown up around the NASA experiments had been part of the problem, but it would have been difficult to know how one would have started it anyway if NASA had come into the Veterans' Administration or any other agency and said, "Sure, come aboard. All you have to do is, you know, arrange an interagency funds transfer to pay for your proportion of this $100 million experimental research satellite." That would not have fostered innovation.

We, however, also felt that the next time around, mission agencies should be sort of trained like large puppies to be prepared to pay for their discretions. That meant a commercial burden. Secondly, we felt that the wholesaler organization that should be established to do all this should be outside the federal government. It should not be NTIA. It perhaps should have some instruction from the ICSTA. . . this interagency committee, but it should be a private group, possibly nonprofit, possibly a commercial carrier. That's something we hadn't thought entirely through, but it was clear they should not be civil services and consequently ensconced for life into a new kind of service, but it should be allowed to decay if the carriers and some subsequent generation bird were to come along and offer a service that was better and more competitive and more responsive. The group should be permitted to die.

The concept then was a wholesaler who would pull together a purchase of volume bulk services from a commercial carrier, and aggregate this in order to bring the prices down. Two kinds of aggregation, the bulk purchase of a space capacity which we quickly discovered to be a relatively trivial part of the problem, that we can do fairly easily. The second is the local integration, sharing use of common ground systems where we recently had an agency that wants two-way video out of San Juan. Another one wants it out of the northwest corner of Colorado, and, of course, they only want to use that earth station for two or three hours a week. Until we could find substantial numbers of people with the capability to pay all in the same locations, it's going to be tough to pull all of this together.

All of this was overtaken by a thing called PD-42. President Carter ordered a review of U.S. civil space policy, and one piece of that was space communications. That, in turn, divided into two parts: one which I think Don will be talking about, R&D technology for space communications. The second was the specific public service communications problem.

NTIA and the eighteen agencies which are now members of the ICSTA came up with a set of alternatives, and the President selected what was sort of the middle option where NTIA was charged to be the lead agency to establish these wholesaler organizations, that a four year subsidy of sorts to go to pay the prices of planning and management of this system, and some costs of unused capacity in the initial system that might be established or systems that might be established, and to more or less manage this and at the same time, within the government, try to move those agencies that have services that lend themselves to space communication, to move them into this particular configuration.

That's really where we are now, short but sweet. Again, long-range planning, we've been talking about it for a year, but on October 1, we just got approval to hire our first full-time person working on this problem. We do have the money coming, and we hope to have an RFP, one or more RFP's out this year to start that process.

We are dividing the problem into two large segments, one involving the distribution of television signals. It may also involve some return television at limited locations. It may expand to include teleconferencing as you know it, but only from very, very few locations. The backbone of it would be a one-way distributed television system for education and training of public officials and others who need the training and the service would be paid for, at least in part, by the public agencies . . . pay as you go.

The longer-term problem, interactive narrow-band communications for small earth stations characterized by, right now I would suspect, disaster relief communications, restoration, a lot of public safety requirements, although there are many others. Those sort of stand out. Those are simply going to have to wait. We see our first mission as pulling together those requirements where there are dollars now identified and requirements that are fairly concrete, pull them together in a way to show both private industry and other federal agencies that we, indeed, can do this. That we are not going to continue to talk about this as has been the case for quite some years.

That's really what I would have to say under my satellite hat. As many of you know, I also wear a hat as a manager with some responsibility for a thing called the Public Telecommunications Facilities Program, which gives grants for the construction of public television, radio and related facilities.

Let me say that I think this satellite area, and I recognize there's a strong representation of that community here, I think the satellite era represents an extraordinarily dangerous opportunity for this community. There are 1400 cable systems out there now with earth stations. There are on SAT COM III, I think, already we'll have three religious channels, an educational channel, two or three

movie channels, a children's program, a full-time news channel. We've just heard announced a full-time black minority affairs program channel supported by advertising. All of this is coming.

We have to lash on top of that videocassettes and eventually videodiscs. Many of the program producers that you, this community, have relied on in the past or program sources, Lincoln Center and some of the fine arts centers and the like, are going to be seduced away by some of these new technologies. Some of the classic roles for public broadcasting are going to disappear. Some of the sources of financing are going to start drying up, and this is an environment when the support for public broadcasting. . .and I agree with President Fleming. . . is not going to be a great increase over the next few years.

It seems to me that in that environment, there is a serious threat to the entire public broadcasting community in this country . . . not next year, not next year, or the year after that, but certainly within the next ten. In that environment, what do you do? If I were to leave you with a prescription, I would say that you should uncouple the management of delivery systems from the production of materials, and then participate in this new era of satellite communications on both fronts.

Some broadcasters, and others as well, will be able to find new production opportunities, and if they are no longer tying that production capability to their own broadcasting antenna, but rather thinking much more broadly about many other outlets, they may find that there are brand new sources of revenue. And among those sources of revenue will be the preparation of training and highly specialized educational materials for state and local governments and, in many cases, a state and local based public broadcasting institution is uniquely qualified to take advantage of that.

Setting aside the production role, public broadcasting has an interesting set of opportunities and decisions to face as managers of a distribution system, and it may be that they will find that they can both develop revenue, get broader use of existing facilities by integrating their delivery systems across several technologies in serving other production houses or state and local governments or the Federal government that wants to use their facilities, whether it's a broadcasting tower, an ITFS network or what, for the distribution of programming.

So, again, we will be trying to do things, and I look forward to your patience and your cooperation.

Remarks
By

Dr. Elizabeth Young
President
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

Thank you very much, Bill, for covering a very comprehensive set of policy issues and problems in a short amount of time. And we will, of course, have time for questions at the end of the formal presentations.

Next we're going to hear from Don Dement. Don's formal education at Drexler University and George Washington University was augmented during his career with the Defense Department. He has been a systems eng'neer and a program manager and a division line chief in his 20 years of work in the microwave communications field.

The last four years at NASA, he's been manager of the advanced communications research program, and last year was acting director of the communications program itself. He has structured the new five-year plan which he is going to share with you today, a strategy for the revitilization of the NASA program, something that we're all intimately interested in and, of course, carried out a number of arrangements toward reaching the goal of the current programs, New Initiatives.

He'll give us a brief view today of the recent work in this area at NASA and a preview of the new efforts in technology toward continuing communications capacity for satellite systems. Don has brought some slides with him and he urges if you're in a chair or position where you can't see the screen, this would be a good time to move.

Don Dement.

What's Coming Next?
By

Donald Dement
Manager
Advanced Communications
NASA

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Liz. Greetings. The title,"What's Next," which I picked up from Bill gives me a chance to be a little bit technological, and so the future, anyway, as discussed today invariably brings some involvement of technology on our lives, and what's more, the Federal government has always been deeply concerned with the use of the radio spectrum and now, with satellites, is concerned as well with the use of the geosynchronous orbit.

What I want to talk about today is the form of the concern that the government has with the use of the orbit and spectrum, and what NASA is chartered to do about it so that as your systems become more and more successful, there will be capacity and you won't be turned away empty-handed or in a position of unaffordability of the resources that are there.

We'll take a look at one of the NASA projects. We'll see what industry has done, and what we think can be done by NASA in its developmental program. And I will say that my paper is much too long for a presentation here, but there are a couple a dozen copies on the corner of the table back there. If you need more, let me know or the PSSC.

As you heard this morning, the commercial satellite picture is a little different today than it was just a year ago. Channels are filling up. It's a simple statement. I think I'd like to show you a little bit of the technical side of that because while I can have the freedom to concentrate on the satellite side and you work with the ground systems side, I think it would be worthwhile to every now and then take a look at capacity and what we're facing not too far away.

May I have the first slide?

This is a picture we've used many times to illustrate the depth of use of the geosynchronous orbit. This is a very detailed slide. I don't expect you to be able to read it. The interesting part is that it is detailed. It started out a few years ago with readable words, and now to get it all on the slide, they've gotten very, very small.

The idea of the slide is simply to show the globe and the geosynchronous orbit in that elipse with the U.S. sector generally defined in this area, and as you can see perhaps even from the back, there are a lot of little dots on that picture. And, as a matter of fact, the numbers of satellites start here with COM STAR III, number 72, and move all the way through here to the western-most satellite, SAT COM I.

This gives a feeling of the domestic satellite picture. Of course, there are many more orbit slots, but unless they produce communications capacity, they're not important to us. Correspondingly, let's take a look at the spectrum for a moment. As you well know, the spectrum allocation is basically in C-band. I might say that the microwave terrestrial people were there first with microwave links, and all of these frequencies are shared with microwave terrestrial. There's even an 18 gigahertz terrestrial link which is shared in this satellite band. The C-band is for fixed services and uplink and downlink at six and four. There is an additional band called Ku band, up at 14 and down at 12, which is either shared or segmented by fixed and broadcast bands. And there is an additional fixed service band at a band called K-sub-A, Ka band, which essentially is up at 30 gigahertz and down at 20 gigahertz.

It's important to see. . . I have ignored for the moment UHF up through S-band because we're not concerned with those directly here today. Let's look at the same graph and see who's using those bands, and just by sheer weight, again, you don't have to necessarily read all the words. But it says that C-band is very busy. Ku band is becoming busy and although there's a lot of green pasture out here, there's almost nobody in Ka band, and there's a very good reason for that.

In this area, we see, of course, INTELSAT which began the use of C-band and our three familiar common carrier satellites which are SAT COM, WESTAR, and COM STAR. We find European programs, Indonesian, European, Japanese, Indian and Russian programs also in C-band, so it's a very heavily used area, and it requires careful orbit separation and/or additional technology to get more out of that 500 megahertz that's allocated to satisfy the channel needs. So one of the ways to do it is simply get out of that band, move to Ku band, and there's another 500 megahertz up and down allocated there. And here we see the Satellite Business Systems coming in, and as far as the U.S. programs go, Satellite Business Systems and advanced WESTAR, the next series of Western Union birds.

In Ka band you see no U.S. programs. These two are Japanese. The CS . . . the Communications Satellite for the Japanese is now up and operating. It operates a full transponder capacity of 30 and 20 gigahertz. ECS-2 is an experimental communications satellite. The first bird was lost last January. They're going to put another one up this coming year, early. And Sirio, the Italian program that before the allocations were made, they decided on their uplink in this area and down in Ku band. So there's not any use of this that is operational yet.

The reason for that is quite clear if you look at propagation statistics, and as you may well know, when it rains in the link path, you have a lot of trouble with 20 and 30 gigahertz. The signal may have fades as shallow as a few DB and as deep as 60 or 70 DB which completely wipes you out. There are technological ways around that. To have two sites which are linked together, and avoid the rain in one link by receiving and transmitting in the other. There are band switching capabilities. If one were to have a multi-band satellite, he could simply get his traffic out of that band, go to another band held in reserve for it. Everybody would not have rain at the same time. That's a practical possibility. And the sheer size of that band . . . 2-1/2 gigahertz predicts that we can use that band with some special techniques to provide good signal margin in that area.

We'll see later how we're looking at that. But what do we mean by running out of band? This is the chart that prompts us to do something. There are two overlays here. Let me first say that this is a time in years, and perhaps that could be focused just a wee bit better, Charlie, if you have a minute there. This is equivalent transponders, which is a measure of capacity that's very simple to make. We call it the transponder 36 megahertz, although SBS will have a wider band width. For this purpose, we'll talk about 36 megahertz transponders. And this is sheer number of those 36 megahertz transponders.

Here are the two WESTARS. Here are the two RCA SAT COMS. Three COM STARS, the WESTAR and SAT COM soon to be in orbit, and assuming here that Advanced WESTAR provides additional service and that the first two WESTARS fail, the capacity continues to go up at about the same rate that the projected requirement does. The actuals are a little bit under this because we didn't count spare capacity in this particular diagram.

However, because of orbit and band width saturation, as we add the Ku band capacity here with advanced WESTARS and add the Ku band capacity and SBS, all three birds will come to a place where we have with like capacity DOMSATS. This is a very critical point. With like capacity DOMSATS, this is about the limit, about 230 transponder worth.

This prompts us to look at what technology can do as far as advancing the capacity without using more spectrum. Let's look at some of these satellites, and I'll

run rather quickly through these because I think you're somewhat familiar with them. This is a WESTAR. It's a 12 transponder satellite with no frequency reuse. That is, it uses 500 megahertz in 12/36 megahertz transponders. And if you add up 12 times 36 and put some guard bands in there, you use the whole 500 megahertz.

This is . . . that needs focusing again, if you can. . . this is a picture of RCA SAT COM. This satellite has 24 transponders, and the reason it does, it has effectively two dishes, one here and one here. They are made such that they are polarized. That is, the signal in a simple sense, is said to vibrate in a vertical plane. Then it ignores the horizontal antenna. And if it is in horizontal, it ignores the vertical so there are really two dishes here. It requires a good deal more power, has larger solar panels than the WESTAR and, as a result, can have one time over using the frequency reuse or two times reuse, if you like.

And instead of having 500 megahertz capacity, it has 1000 megahertz capacity because it uses the spectrum over again. That concept of frequency reuse is extremely important for the future. It's the basis of a lot of our work, and I think I can explain it even better with some others. This is the COM STAR satellite built by Hughes. It has considerably more power, as you can see. It is bigger than WESTAR. The reason is that it has 24 transponders like RCA SAT COM, has twice the capability of the WESTAR, and the reason for that is that it has a polarization separation the same as RCA, but done in a very different way.

Let's take a look at that antenna. Here we can see evidence of the polarization separation. There are two antennas on the space craft. This one has a polarization screen in front of it which enhances what has already started as vertical polarization down here in the feeds. The signal bounces off this back feed here and then comes through this vertical screen. Similar thing is done in the same frequency band with this antenna, only it is horizontally polarized. So when the ground station is either horizontal or vertical, you have a capability, again, of having 1000 megahertz capacity and only 500 megahertz of allocation.

The international satellites are much the same. This is a picture of INTELSAT IV which did not have polarization separation, and IV-A, which was a similar bus but now has polarization separation. It did not carry polarization screens. What I'm making a point of is that there are two times frequency reuse easily available with careful design in polarization reuse. However, there are better ways to improve capacity even over polarization reuse. Polarization reuse is very capable at C-band, somewhat questionable at Ku band, and perhaps unexplored a bit yet in Ka band. There are spatial diversity methods and others that can be used for additional frequency reuse.

Let's take a look at . . . as long as we're talking about INTELSAT's, take a look at INTELSAT V which is pretty well built and is getting ready for

launch. INTELSAT V is, as you can see, radically different from INTELSAT VI-A. It's a body stabilized space craft with a lot of power on these power solar panels. The feed farm is on this tower, and there are four dishes around it. There are earth coveraged horns here, and as the dishes get larger, as you know, the spots on the earth get smaller. It is designed not, however, to produce round spots but in the feed horn, they are so organized and phased such that these dishes produce shaped beams on the ground. And, in addition, it carries both C-band and Ku band overlaid so we have polarization separation. We have separate shaped beams, and the attempt is to get a lot of frequency reuse from this satellite.

It's naturally more expensive but the cost per channel continues to go down when this technology can be developed and orbited. Going even further to a very sophisticated satellite, this is the satellite called the advanced WESTAR or TDRSS. This is a TRW-manufactured satellite. It is also getting very close to being launched. It has two completely separate uses. It has an S-band and KU band use for NASA, which I won't delve into. There's an S-band phase array in which this satellite can point beams for what they call forward and return links to other satellites, and then an up and down beam to link down to White Sands, New Mexico, which will be the base station for the TDRS and Advanced WESTAR.

However, there are additional dishes on here for advanced WESTAR use, and the same satellite can be used for both services. There will be four of these in orbit, two used for TDRSS for NASA's use at 72-142 degrees west, and there will be a third one essentially over the United States for Advanced WESTAR use and a fourth, which is a spare kept between the two TDRS birds.

The interesting thing about this satellite and, as I mentioned, they are quite different is these two 15 foot dishes which are capable of tracking low orbiting satellites with a spot beam in NASA's use, and of placing a spot beam on New York, Miami, San Francisco, wherever you'd like to put that in the Advanced WESTAR system.

So we're getting ground beams in a very small spot from the Advanced WESTAR service. This is, as you can see, a considerable advance over the original WESTAR. It's a second generation for Western Union. It carries both C-band and KU band so it has considerable frequency reuse in that you can provide CONUS coverage . . .that is, continental United States coverage and, in addition, put a high powered spot beam for heavy trunking traffic by use of those 15-foot dishes.

The concept is somewhat like this diagram, and this is a concept to show how one could use spot beams were they perfectly organized in very close

proximity . . . for instance, Detroit, Chicago area, northeast corridor, and the basis of the diagram is simply to show that spatial frequency reuse is quite practical if you can provide antennas that are, indeed, completely isolated. That is, this antenna in no way provides any signal into that ground station, and this antenna being not into that one.

The problem, therefore, in multiple spot beam antennas is to provide very good isolation, and that means low side lobes, good cross-polarization and a lot of other technical things that have to be done by very careful design. But you can see that the outcome is very important because rather than getting polarization separation, which gives you two times frequency reuse, the very same spectrum, whether it be at C-band or Ku-band or Ka or wherever, if you can build an antenna like this and with complete separation and serve all these areas, then you have multiple frequency reuse, conceptually, as many times as you have spots.

Naturally, that is fine on the artist's drawing board. When you really get down to bending tin, it's not quite that easy. This is one concept which you might remember as separate spots. There's another concept which has to do with complete coverage of an area, and if we can just look at this upper diagram for a moment, this is a picture, a diagram of the United States which is covered in this case by 15 beams, and a beam out toward Alaska which, for the moment, we will ignore.

The idea of this kind of coverage is to provide complete contiguous coverage by. . . and also achieve frequency reuse. In this particular scheme, the yellow and blue beams are on the same frequency. That is, this line and this line are all the same frequency, but they're orthagonally polarized. They are at right angles to each other. One beam is vertical. The other is horizontal, the same as we've done with COM STAR and RCA SAT COM and INTELSAT IV and V. The red and green beams are on a different frequency, and if you only had 500 megahertz, that means 250 megahertz is on the yellow-blue set; 250 megahertz is on the red-green set.

Why this is hard is that one has to make a separation, and if you've ever heard of the four-color mapping problem, it applies directly in here. One can pick a set of four different colors in which no color touches itself at any time, and yet you can cover that entire area. The way this particular system was laid out was that 15 beams would cover the continental United States and since the frequency has to be separated into two . . . that is, not frequency reuse . . . we wind up with 7-1/2 times the reuse of the frequency spectrum on the continental United States.

If you remember a moment ago, I was saying that it's difficult to provide side-lobe performance so that you really have no interference between beams. The worst problem here is in this beam which is up around Wisconsin, if I can take that as an illustration, because it has to suffer from the side-lobes of the same frequency and the same polarization of all four of these other blue beams potentially getting into it.

The question then in this NASA project, in contract with TRW, was can you build such an antenna that completely covers the United States at Ku-band, and can you get the side-lobe isolation that you need in that particular beam? This is a quick picture of one of the designs that came forward. There were several made. This is an expanded idea of that. That's one of the feed horns for the antenna. When we put them into an array, each of these horns, then, covers one of those spots. There are nine horns here with a port and so forth, and you can actually label these inputs and outputs with the numbered beams that were on the previous chart.

And when they are all put together with a reflector to give you an idea of size, this is a two-meter dish, and this is just a test stand. It's not a satellite. And we used the polarization screen again to get polarization reuse, as I mentioned a moment ago. This horn feeds right through the polarization screen. This one is reflected by it.

How did that antenna perform? Well, the computer said that we should have, if in the blue beams should perform like this such that, for instance, this beam with 36 DB down . . . that is a very small amount of power . . . would be at this point, right within this coverage of this beam. The computer therefore said we would have 30 DB of isolation. The specification was 28 DB. This is an actual from the finished project and that same beam, if you'll ignore the Alaska beam for a moment, which was added later, it says that, in fact, we got 28 DB isolation in the most difficult situation.

As another way of looking at this, when one moves off of axis. this is a similar contour of plot just turned on its side. When one moves off axis 4-1/2 degrees which is about the edge of the continental United States, that worst problem he has is with his side lobe, and that's 33 DB down so we think we've built in hardware something that can meet the criteria. I won't bother you with all these numbers except to say that on side-lobe level in this project, we tried to get greater than 32 DB down. The on-beam performance was 36 DB and cross polarization exceeded 32 DB. So for this particular antenna, we seem to have achieved an edge performance that was quite practical for use.

In the same project, this antenna was built with the same kind of techniques. . . power splitting techniques, and this antenna feed horn could be used with a dish, same size . . . 6 footer . . . to provide the Eastern Time Zone coverage. If you remember something about feed horns, this is simply an inverted picture of the Eastern Time Zone. This is Maine. This is Florida. And the actual contour would be well inside this because these outside horns are side-lobe suppressing horns.

So much for a NASA project in which we tried to show that we could get the frequency reuse by shaping the beams, getting very good side-lobe performance. The next area I'd like to look at . . . that's really a blank . . . I'd like to mention that as a result of our work with the Ku-band antenna and are looking at the next frequency band, and our five-year plan structure which really turned out to be much longer than that, we were able to see our way clear to a combined program which looks both at multi-frequency antenna systems and at the 20-30 band, in particular.

Technology for the 20-30 band right now does not exist in applicable form to satellites.

What I'd like to review very quickly is our last year's work, '78 and '79, in which the Lewis Research Center set about doing a four-contractor, two-part study. In that study, there was a market assessment made by two carriers: International Telephone and Telegraph and Western Union, in which they assessed the potential market. They looked at the entire telecommunications market through 1990 and 2000. They subtracted out that portion which would likely be served by terrestrial, including new technology, fiberoptics, whatever you'd like, and came down to the net addressable market . . . that is, the market that might be satisfied by satellites.

They concluded that the communications traffic growth will exceed the capacity and it was just a matter of when. I think we all had the feeling for that. Exceed current C and Ku band satellites capacity. Remember that earlier viewgraph where I said in like DOMSATS by 1990. The need, then, is for doing something about capacity which can be done both in higher bands and in technology, as I've described, in spot beams and in continguous beam, multi-beam antennas.

In conjunction with those studies, Hughes Aircraft Company and Ford Aerospace Communications Company designed conceptual systems which looked at the 20 and 30 gigahertz area, and that was fed back then to these carriers who looked at the addressable, net addressable market not just for satellites then but the addressable market for the 30 and 20 system.

Those studies are now complete, and extremely briefly, let me talk about the assumptions that went into them, and then I'll give you a simple graph which shows a bit of the results.

The assumptions were that multi-frequency bands will be there. We will all be using C, KU and KA in various ways for various reasons, but the spacing will be dictated by C band. Now, that's not necessarily true if you go to try to pack in 30-20 gigahertz satellites. You can space narrower than that, but that was the assumption for the study.

The segment would be 100 to 140 degrees west, that there would be half a gigahertz and 2-1/2 gigahertz allocated as they are today. The reason that assumption is there is that there is a General World Administrative Radio Conference currently under conduct in Geneva which may very well allocate some more band that was not considered here, and some of the predications are, is it's very unlikely that that would happen.

It assumed polarization diversity at C-band, which has been well proven. Ku-band is under discussion, and some people will be using diversity. This study assumed that you could. The traffic was expressed in the same familiar 36 megahertz transponders, and this, I believe, is an output, not an assumption, necesarily. It says that U.S. year 2000 traffic will exceed 1000 transponders. Here is, again, an overlay as we saw before, except it goes now out to the year 2000. Before we looked at up until about currently, and here is that same chart I showed before which runs up to about 257 transponders.

IT&T wasn't quite as bold as Western Union. They both go off the graph, essentially, and the interesting part is that by 1990, if you look at a vertical here, we are well above 1000 transponders, equivalent transponder capacity with equivalent satellite capacity to today. The question is, what do you do when this saturates and the line keeps going up? Do prices go up? Do people go away empty handed, or is there a way to apply technology as a solution to that problem?

I wanted to show you a little bit of what one of the contractors designed as a system. He picked 10 sites. Lewis and the contractors agreed on the two approaches. One would be what was called a trunking system, in this case fairly obvious what it is. A single satellite with a high capacity, a full 2-1/2 gigahertz in 10 spot beams, 3/10 degree beam with and 25 gigahertz per second total data rate. Major interconnections between cities at high data rates. The other system, which I do not have a graph on, was a direct to the user system, which is much more like that continguous overlapping beam system. Preliminary results show that that's a rather costly system. It had a single beam with, I believe it was 25 links in each of the beams, 25 ground stations,

whereas this other one with this kind of a satellite, would have essentially 10 beams total, and each satellite could communicate with all of the ground segments. This is a concept which I think remarkably looks like INTELSAT V because it was a Ford product.

And, again, we see a casagrain system with reflectors about the same size. The reason that the spot beams are so much smaller is that 30 gigahertz, of course, is quite a high frequency compared with their current six, and much easier, frankly, to provide small spot beams.

In 1979 as well, which is just over. . . these charts were made about three weeks ago so they're just approaching the new fiscal year, in this 30-20 gigahertz wide-band program at Lewis, it's moving toward two basic technologies: a full base band processor for onboard switching and an independent beam space craft antenna. We haven't necessarily picked these numbers directly as 10 beams or 25 or whatever, but these are the two basic technologies. There will be additional market studies and power amplifier, a critical technology for the downlink power amplifier at 20 gigahertz to begin with when the satellite is underway.

Now, fiscal '80, there are studies and there is a technology chart. In the study area to be a continuing market assessment, a conceptual design more than just the technology, and assessment of satellites versus terrestrial and continuing identification of critical technology in this study area. However, in a technology area to show that we are moving out and we are funded for 1980, there's quite a bit more under the technology development this year. The switching matrix, in addition to the base-band processor, multi-beam antenna technology will be in a position to select winning designs from prior studies, fabricate and test perhaps more than one experimental model.

Component development expands from power amplifiers now through full transponders, and power processors, power switches and low-noise amplifiers both for the up link and down link. The 30/20 gigahertz subsystem bread board will be the beginning of the putting the whole system together for a simulated capability. And for '81, a natural outgrowth of that, continuation of the studies, evaluation and comparison with alternative means, we're always careful to look at what the alternative means. This is a very practical program and not a demonstration. It's intended to look at all other technologies, and be guided as well as we can with the timeliness of the government budget involved in doing what we can as a far, long-term development.

Engineering model of critical components, onboard switching and all the things we've seen before, and now the integration of these components, we begin in

this year the development of ground terminals and the simulated network that we built in 1980, and here is the first time you'll see the words "Flight Program." And this year, it's expected that we can define an experimental program and the overall project plan.

We're looking toward a 1982 new start, if that definition succeeds and with a flight program, and shows that it's really necessary. That's not a foregone conclusion that we should fly something. It might be very practical to thoroughly test and develop things on the ground.

And the last is, why are we doing all this? And this is a chart that I like to either begin or end with, to leave you with the thought that the owner, operator and user needs several steps gone through. He needs to start with study and research and demonstrations, and NASA goes down to about the point where service and cost experience is gained by operators and service suppliers through pre-operational demonstrations. There are a lot of other offshoots from our research and sometimes we'll stop when we've simply provided technology that's useful for component and subsystem manufacturers. Papers, designs and demonstrations, and this is where we're going this time to stop short of providing an operational system. We may provide operational demonstrations. This generally means a flight program. We may not get to that point, but the general thrust of the orbit and spectrum use, the capacity, the success of your programs is certainly driving new technology into the fore, and we think we've got a place here. We've studied it thoroughly. The plan has been endorsed by every major participant in the industry, from manufacturers and carriers. And we heartily endorse your forward looking use. We hope that the technology is there, that the transfer such as this diagram shows is made, and that the industry can take up our research and provide real services at an affordable cost.

That's all I have.

Questions and Answers
By

William Lucas
Associate Administrator
National Telecommunications and Information Administration

And

Donald Dement
Manager
Advanced Communications
NASA

Fourth Annual Conference
Public Service Satellite Consortium

DR. YOUNG: Thank you, Don for a most informative, enjoyable presentation, and now we do have time for questions of our two panelists. Please indicate, if you will, who you're directing the question to, and please speak loudly enough so all in the room can hear you.

MS. RASH: I'd like Don Dement to know that his speech was so popular that the 24 copies he brought are gone from the desk, and if he'll bring some more tomorrow or we can stop by his office and pick some more up, we could put them out at the luncheon period.

DR. YOUNG: Supply and demand taken care of. Don, I'd like to ask, what kinds of application programs do you see being tested in the 20/30 gigahertz program?

MR. DEMENT: Well, that's a very difficult question at present. The applications programs would begin in perhaps 1986. I'm not sure where we'll stand at that time in the commercial area.

Liz asked what kind of applications programs might be being in a 20/30 gigahertz flight program, and my answer is that it's very difficult to say at this time. The first application program that's on such a flight program is 1986. While we have to look forward, we don't quite have visibility that far. I don't know where we'll be in the commercial area at that time, where you folks will be in the public service area. It is a very critical question, however, to our moving forward. It's not something we can put off for a few years.

We've been pressed very hard in NASA to come up with, for want of a better term, a disposal program. Once we've decided that the technology, indeed, works and performs in whatever manner it does, what do we do with the satellite? It's probably going to cost $100-$150 million to provide this kind of technology in orbit, if it does go in orbit. I keep emphasizing that. We are not sure that we'll have a flight program.

If we do have the flight program, we've characterized about five different options as to what the disposal could be, and there are precedents for various things, and there are no precedents for others, and it's quite an open question at the moment.

If you have innovative ideas on the use of our satellites, we'd like to hear from you.

DR. YOUNG: We'll ask you to bring your crystal ball back next year. Are there other -- yes, there's a question in the back.

AUDIENCE: Yes, I wondered if there was any coordination between the civil sector and military sector.

MR. DEMENT: Thank you for asking. The question is, is there any coordination mechanism regarding military and civil sectors. There's probably more coordination now than there has been in years. As you may know, that frequency diagram is a bit incomplete. It does not have the military bands on it. For the first time in development of new satellite frequencies, both military and civil have adjacent bands. The 20/30 gigahertz band, 2-1/2 gigahertz is allocated to civil use and one gigahertz is allocated to military immediately above each of those civil bands.

What that means is that regardless of the eventual use, the technology will be applicable to both. We've begun a program in that Lewis Research Center, has long been a high power TWT development agency. We've been approached quite a while ago by the Air Force for development of a TWT. And in that we were now interested in that 20 30 area, we have a joint program in which we're jointly funding, but Lewis is undertaking the work. RFP is out on that, and it's actively moving along with '79 funds.

In addition, there is quite a bit of antenna technology which is convertable to our use. When one needs to move a beam quickly, an antenna beam quickly, it generally means electronically move it. As you may know, the Defense Satellite Communication System Phase III has developed a very agile beam system. It's not directly applicable to our use. They start from a different base. They do it for a different reason, but the theoretical work that's been done and the computer development that's been done to design that kind of antenna is now at hand for the civil sector to use. There are several other kinds of developments in that we are now joining in a formal team, revitalizing a former technical committee that used to meet directly between NASA and DOD. In the next few months that will have the first of its quarterly meetings so that general information is passed, and we don't have to have a

specific topic or budget examination just to get the other. There are many influential involvements that cause us to be closer together.

As you know, our entire management at the top in NASA has some military background, and the shuttle program has brought quite a bit of coordination between DOD and NASA anyway so that we're, I think, very much closer not only because of frequency allocations but because of technology development and because we very well may have some sort of at least a joint information program. The OMB will be sure of that, that we aren't doing things twice.

And at the very most, I don't know. I'll leave that to your imagination, what could happen in the programs. Ordinarily, NASA budget money is well protected for the civil area only. I'm not quite sure how that's going to come out.

DR. YOUNG: Thank you, Don. Other questions for either of our panelists?

(Question from the audience.)

MR. DEMENT: I'd like to pass the answer to that. The question is involved with our technology look and our market and systems demand studies, or systems studies and market demand studies, I should have said, and whether they involve new technology with regard to band-width compression. That is, rather than using a transponder for one television channel, is it practical to put two through and keep the same high quality or be willing to accept a slight degradation and to the point of putting four, and where does one stop?

The answer to that is that NASA has been working with band-width compression for quite awhile in technology, and I'm sure the private industry is now implementing it. I'd like to pass the answer, however, to Joe Sivo who I'd like you to know anyway. Joe is in the back of the room, is director of the communications division at Lewis Research Center. He's the guy who's going to have to do this, and we sent pots of gold, and they dispose of it and bring good things.

Joe was nodding yes when that question came up.

(Mr. Sivo responds to audience question.)

DR. YOUNG: Are there other. . . yes, Mr MacDonald?

MR. MacDONALD: Have you looked at the use of these nine-spot beams in terms of problems with cloud cover, weather conditions, in terms of the average to find out some index of when, on the average, the amount of time that you would have with the 20-30 gigahertz?

MR. DEMENT: Yes, the question concerning 20-30 gigahertz use has to do with weather . . . and the potential for the statistics coming out in a favorable way such that rain statistics and attenuation statistics, first of all, do they match; and secondly, does the system survive in a statistical sense over what percentage of the time?

That rain propogation data has been being collected about 10 gigahertz on the order of 10 years. A great deal of it was sponsored by NASA and by Bell Laboratories. All of that was taken into consideration with regard to the 20-30 band and, as a matter of fact, it was almost the first problem taken up. I'd like to give you some numbers, and Joe, back me up here. The Bell System purports to run at four nines . . . that is .9999 reliability. It is thought that .9995 would be a significant degradation. The 20-30 system will have difficulty meeting that with straightforward ground terminals.

If there is site diversity. . . that is, two terminals put approximately 10 kilometers apart, and don't hold me to the number because there is much discussion on that . . . it costs to link those terminals together, and the further away you are, the more it costs. However, the closer together you are, the more likely you are to be in dense rain. We're not talking about getting in severe difficulty with light rain or in Tucson, Arizona. We're talking about Tampa and a large percentage of the time having tremendous amount of rain in very dense environments in the link path. GTE has used the COM STAR satellite, as you may know, in a three-way site diversity experiment, and has reported the results recently, and they've been made available to the study.

It appears that with one site. . . here's a number I'm not sure of . . . with one site, I think we're into about .995 on the average as a reliability number.

MR. SEGAL: That's right.

MR. DEMENT: It depends on where you are in the country.

DR. YOUNG: Are there other questions?

AUDIENCE: You said you may or may not have a flight operation program. Is that solely based on economics?

MR. DEMENT: The question is, is our potential flight program decision based on economics. That certainly is a large part of it. However, given . . . it's an interesting exercise to ask yourself if you had unlimited money, would you fly? Or is that decision still open? And I think that given unlimited money, the decision still has to be made positive or negative.

It's quite practical to expect that a government industry liaison could be formed by which that ultimate disposal use could be made into a program where real services are provided by a carrier, but that the front-end risk is taken by the government. And we haven't been able to completely model that yet, but that's one of our options and in that case, that leans one more toward being able to fly because you can see the ultimate use. And it might, in the most conservative case, simply be a C-band common carrier satellite which has a 20-30 package on it which, if it fails, has no effect on the common carrier.

We doubt if that would really be implemented because the carriers are extremely interested in 30-20, with one exception which we simply haven't had time to contact. We've gotten complete support from the carriers. They are very interested. They want to play this decision business with us, and we're setting up, even above our advisory committee now, which involves the industry, we're setting up further working groups so that we keep tightly involved. We know that these curbs really turn out to be. We know what the character of the user market is. We know what the character of the pricing is, and the pricing acceptance, and we know where we're going.

DR. YOUNG: If there are no other questions, I want to thank again Bill Lucas and Don Dement for a stimulating afternoon, and give you a few housekeeping notes before we adjourn. The buses this evening will depart from the terrace level. That's the lower entrance level at 6:30 p.m. Please be on time, and please bring your reception buffet tickets with you. They will be collected at the Botanic Gardens, and I understand that there are guards posted and person-eating snapdragons in the gardens to take you away if you don't have your ticket.

The reception actually begins at 7:00 and will go until 9:30 at which point the buses will bring you back to the hotel. Tommorrow, Friday, there will be no general session in the morning so you are free to attend any of the small group sessions, and we've clustered them so you can go to three sessions. They will run from 9:00 to 10:00, 10:00 to 11:00 and 11:00 to 12:00. The topics and the locations are on your program.

Lunch tomorrow will be here in the Monroe Room starting at 12:15. Please bring your luncheon ticket and, of course, we do have our speaker at that time, Tom Wheeler, President of the National Cable Television Association. I'll look forward to seeing you at the Gardens tonight.

Remarks
By

Dr. Elizabeth Young
President
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

Thank you. Just a few notes that will be of interest to you. A number of you did express interest in receiving a copy of Don Dement's text based on his presentation yesterday. If you would like a copy of Don's remarks, please give your business card or write your name and address on a piece of paper and give it to Polly Rash...Polly, do you want to stand, I'm sure everyone knows who you are...at the end of the day, and we will be sure that you have a mailed copy. Give Polly a hand.

Also, we want to remind you that it's not too soon to put on your calendars the dates for next year's PSSC meeting which will be here at the Washington Hilton, October 8 through 10, and, of course, we will be sending you details in our coming publications, but October 8 through 10 in 1980 will be the Fifth Annual Conference, and, finally, I'd like to remind you that the Annual Membership Meeting will start immediately following lunch convening at 2:15 in the Map Room. The agendas for the meeting will be available at the door.

It gives me great pleasure to introduce our speaker today at lunch for a number of reasons. First of all, my introduction to him was through one of the loveliest people I've met in the course of my professional life, a woman who really befriended me when I came to Columbus, Ohio and was very active in our public broadcasting operations there. It happened to be Tom's mother. She is not only a charming and gracious person, as is his father, and a thorough-going professional in all of her ventures, but she's excessively modest. For a long time before I had the opportunity to meet Tom and his wife, Jane, Martha Wheeler told me that her son was in media in Washington. Somehow she gave me the impression that perhaps he was an engineer or a time salesman for one of the stations. It was only after a great deal of prodding that I even found out he was with the National Cable Television Association. Then it took a little more prodding to find out that at that time he was the Executive Officer, second only from the President of NCTA, and as Executive Vice President, of course, was very visible in the cable community and also to many of us.

Tom's background, of course, is that he's a graduate of Ohio State University. We've just been exchanging football stories at lunch, and he did his graduate work there as well. The guests will just ignore that. We will now call a halt to this completely uncalled for proceeding.

Tom has lectured on government and politics at numerous colleges and universities, including the John F. Kennedy School of Government at Harvard and the United States Military Academy at West Point.

He's included in "Who's Who in Business and Industry," and is a member of the Board of Directors of the National Video Systems Marketing Corporation. This year, he also assumed the Presidency of NCTA, and he comes to us this afternoon to talk about how he sees the present and the future in terms of cable and satellite.

Tom Wheeler.

(Applause.)

Luncheon Speech
By

Thomas E. Wheeler
President
National Cable Television Association

Fourth Annual Conference
Public Service Satellite Consortium

Thank you, Liz. You can't go all bad when you've got your mother doing your advance work for you, right? It is a pleasure to be here among you great Buckeye fans, the gentleman back here at the table. One of the things that Liz didn't mention was that when I was doing graduate work at Ohio State, I was also in the employ of the University as Assistant Director of Alumni Affairs, and I used to travel the country with a man by the name of Woody Hayes who you probably remember as a former professional boxer with a poor left hook, and that was a fabulous experience, and I feel very strongly about Ohio State and still do today, and I just would suggest one thing to those of you who are going hiss and boo over in the corner, and that is that we're still number eight, and there's only seven of you really who can talk about Ohio State football.

But it is a pleasure to be here, to be with Liz, because, as she said, we had the great opportunity to meet in my parent's living room when she was running WOSU, and what a great job she had done there. It's also a privilege to be here with a man like Rex Lee who has blazed his own roads in communications in this country and is now heading up your organization.

I guess it's significant...we were talking at the table...that satellite technology has arrived. Neiman-Marcus has made it official that you now can get from Neiman-Marcus in the Christmas Catalogue for the amazingly low price of $36,600 your own satellite earth station, so, I guess, a new day is born, and the folks in Texas have made it for real.

I'm interested that you're coming back to Washington next year. We kind of call this Disneyland on the Potomac. A lot of strange things go on here, and I don't know. One of the things I do in my present capacity is I go out and I visit with a lot of state associations and other media groups around the country, and they're always saying, "Okay, this is the guy from Washington, what's really going on in Washington," and they all expect a few stories about what's going on in Washington, and it used to be difficult to go out and be funny about what was going on in Washington.

Today, it's just rip and read news. But I do want to let you know that this morning I was given some inside information I'll quickly share with you about the President's

inflation plan, I'm sorry, what he plans to do about re-election which is tied to his inflation plan, and that's basically to try and keep his popularity two points above crime, but I don't know if it got covered out in your parts of the country, but there was a big to-do made here in Washington about the attack rabbit. Did you all pick up in your newspaper the rabbit that swam out and attacked the President while he was fishing? That crazy rabbit is the only thing that's been trying to get in Carter's boat for the last six months.

But, you know, when I think about cable and about satellites, as a matter of fact, I'll tell you when I was specifically thinking about cable and satellites, and Andy Litski who's here from NCTA and I were talking about this as I came over, I kind of rewrote my remarks after I went out and did my morning run this morning, because I had a thought. I get up in the morning, and I'm lucky enough to live very close to the Potomac River, and the C&O Canal runs along the Potomac River, and thanks to Justice Douglas and the National Park Service, that's been restored, and it's the world's greatest jogging path.

So I was running along the canal this morning, and I started to think about the similarities between that canal and our business. I started to think of the impact of the canal on commerce, on communications, on the flow of ideas and goods and services, and then I realized, you know, what? The poor suckers who built this thing thought they were digging a ditch, but they had no idea about what the real impact of that ditch was going to be, that it would determine the locations of cities and businesses, that it would make millionaires out of those who believed in it and saw the potential and paupers out of those who didn't, that it exposed isolated people to new ideas, and that it stimulated new agricultural and industrial output, and they thought it was a ditch, and it suddenly dawned on me that all of us in this room are ditchdiggers, that we're all working at building something that we know it's a satellite, it's a satellite delivery system or it's a cable, but really all we know is it's a ditch. It's a means of communicating, and we really don't have an idea as to what's going to fall out from that new development.

I don't have the answers to what's going to fall out. That I did figure out as I was running along the ditch this morning, but I do know that we've got to keep moving on, and we've got to keep saying, "How do we move this ditch a little further," and I do know that the solution is not to stop and study the question about what are we going to do with this ditch, and that's because we can never anticipate the synergism, the exciting kinds of things that can happen when our ditch, our communications network, begins to touch people the way this canal did.

So what I'd like to visit with you today about is cable television, our specific part of the ditch, if you will, what's been happening in cable television, how both of our groups are building around satellites, and what that means for the future for both of our entities and both of our operations.

What's happening in cable television? If you were to have asked a cable operator three years ago what he did, he'd say, "I string wire from point A to point B, and over that I put some signals." If you were to ask him today, he would give you a completely different answer, because the exciting thing that's happened in cable television, and it's the door that's opening for you all, the exciting thing that's happened in cable television is that we have moved from a hardware orientation to a software orientation, and this happened for two reasons: one, basic necessity that if we were going to justify the high cost of building major markets, we had to provide for the stimulus of new demand, and we couldn't do that with more retransmitted television signals; secondly, at the same time we realized we had to have a new product, the advent of the communications satellite that you all are using so effectively.

It came along, and what happened was the cable television industry which began as a community antenna to provide service, basic television service, for areas where there was none suddenly became a new kind of operation and became a programmer. Our reality is that if we are to open new urban markets, we have to stimulate the demand to justify the cost to do it, and when I mean cost, I'm talking $50 to 80 million to wire each of the major markets of America. Like, if you wanted to wire Washington, D.C., $50 or $60 million.

You can't go out and go to somebody and say, "Will you subscribe to my service," when you're only offering them retransmitted signals. The difficulty we've had has been that the federal government has limited the kinds of services we can provide, and so we had to go out and develop our own new services, but the problem was, how do you distribute those new services economically. At about the same time that we realized that we had to have some kind of something special to get into the major markets, the domestic satellite came along, and the revolution that took place with the advent of the satellite is continuing today.

As I said before, three years ago, if you asked a cable operator what he did, he said or would have said, "I string wire to bring signals." Today if you were to ask a cable operator what he does, he would say, "I am in the programming business, and I string wire as the means of getting my programming out." Completely different orientation.

And, so, what has this meant to cable in terms of its growth? We're now in 20 percent of all the television homes in America. We estimate that by the end of 1981, we'll be in 30 percent of the television homes and 50 percent of the homes by the mid-eighties. There are now 4000 cable television systems serving 9700 communities. 2000 satellite earth stations will be in place and hooked to cable systems by the end of this year. By the end of next year, 80 percent of all cable subscribers in America will be reachable by satellite. There is, in essence, one full satellite that carries cable traffic, SATCOM I and soon SATCOM III.

Let me give you a sample of the kinds of offering that are up there on that bird. Six movie and entertainment channels, two children's channels, and I don't mean more

Saturday morning television. I mean quality, limited violence, non-sexual programming that you would want your kids to watch and learn from. Three religious channels, two sport channels, gavel-to-gavel coverage of the House of Representatives. Everybody thought that was going to be the greatest thing since Sominex, but it's amazing what's happened. People are watching. We've created Congress junkies. There is a bar in Lafayette, Indiana...I swear this is true...there's a bar in Lafayette, Indiana that the old boys go in there during the day, and they sit there on their stool and they drink their beer, and they yell back at the TV set, because they're watching the congressmen that are on. Better than the soaps.

There are two all news channels, one that's up now on a slow scan and one that's going to come up in the middle of next year, Ted Turner's Cable News Network, that will give broadcast kind of coverage 24 hours a day. There's a black channel that's just been announced that will start the first of the year. There's an older American's channel that is getting ready to come onstream. There's a women's channel that's being developed. There's the work that's being done by one of your own members, the Appalachian Regional Commission, in doing programming for cable delivery, plus we have distant imported broadcast signals.

So cable has really evolved from the community antenna concept to today's concept of a video publisher, and I'd like to focus on that for a second, because it is that concept of cable television which is the opening for our interrelationship.

A video publisher, as we see it, does several things. He aggregates an audience. He develops special programs for that audience, and then he markets those programs to the audience. In essence, the cable operator becomes the local editor. He begins choosing among programming, and putting together, if you will, something akin to a city magazine. You know, if we talk about Columbus, Ohio and Ohio State for a second, there's a magazine in Columbus called "The Columbus Monthly," and you couldn't get "The Columbus Monthly"to write a story on what's happening in Pacific Eight football if your life depended on it. Likewise, you couldn't get "New West Magazine" to write an article on what's happening in Big Ten football, but they'll sure buy Big Ten articles in Columbus, and they'll sure buy Pac Eight articles on the West Coast, and that's the role the cable operator will play, because there will be available off the satellite programming that he says, "Hey, that will appeal to my audience," and he begins to exercise an editorial function.

As a result of this change, several things have happened. We've begun to build major markets. We've begun to attract topflight programming. We are building sizable channel capacity in our new systems, and we're building two-way capacity in our new systems. All of these, I believe, point in the direction of us, you in the PSSC, us in the cable business working together, because cable is rapidly expanding into the new markets where you see your potential, and because cable is building sufficient channel capacity to carry you, and because the two-way capabilities of cable offer some interesting potentials for both of us.

So what does it mean to both of us now that this door is open? Cable has the broadband loop that you need to distribute the programming that you're putting off the satellite, but I must caution you that you should not view us as being in the transmission business. You should not look at cable operators as being broadband carriers. Cable is a video programmer which has incidental transmission capability, and if you approach the cable industry on that front, you're going to be much more successful than if you go to them and ask for the local loop for several reasons.

One, the local loop in many of the classic systems is rapidly filling up. Two, cable operators don't want to do things that would lead the government to say, "Hey, you are a common carrier." And so, if there is going to be a lasting relationship between our communications activities, then you are going to have to interrelate with cable on a publisher/programmer kind of relationship.

Sure, in some systems, we have capacity you can lease, but it won't always be that way. The capacity is filling up, as I said, and many of the systems are already saturated. We talk about ourselves as the publisher and the writer. Don't come to buy space in our publication. Come with a message that together we can deliver. Bring us editorial content, because, remember, our job is to aggregate an audience and deliver programming to that audience.

I met with one of your members the other day to talk about what we could do to hook up hospitals. Let's talk about that as an example. What a terrific thing it could be if the groups represented here could put together programming for patients in hospitals so that a guy laying on his back flat after a heart attack can turn on his television set and see how to recover from a heart attack or see just basic hygiene or whatever. You distribute that nationwide by satellite, and you come to the cable operator, and you don't say, "Hey, I want a loop to the hospital." You come to the cable operator and you say, "I have an audience. It's people that are lying flat on their backs. I have the programming that sends them some kind of a message that they need to hear. Let's the two of us work together with the hospitals to develop a relationship where the hospitals will buy the service, and we will both profit from it."

In other words, what I'm suggesting is that you build yourself on the model of the cable suppliers, the Home Box Office, who say there is a market in entertainment programming, I can put the programming together, and then working on conjunction with the cable system, we'll go out and market that programming and split the take. That's the video publisher kind of concept that we see ourselves evolving towards.

I want to emphasize again, we are not a local broadband common carrier. Our function is to provide diverse programming and we may look at times like a common carrier, but we aren't going to operate like a common carrier. I think the possibilities for us working together are limitless. Look at our position. We've got channels we need to fill, and you've got programming that you need to distribute. It's a great kind of a position for us all to be in. You have the programming; we have the method of getting it out.

But let me just bring up one word of caution, and it relates to something that Rex Lee and I were talking about at lunch, and that is that while there is this terrific potential, one of the things that can kill it as quickly as anything is the return to the bad old days of blue sky and overpromising and overexpecting. We must be realistic in our expectations of what we can do, because not every good idea is a marketable idea, but every marketable idea opens the path for other new ideas.

So it may not be that we can work something out on everything, but there is a relationship. Now, my dues paying members would consider me remiss if I didn't engage in a commercial at this point in time. Cable television has been a creature of the governmental process ever since the day that it came out of the hills of Pennsylvania and Oregon and West Virginia and began to be something more than community antenna. We are perceived to be a threat to two major segments of our economy, the broadcasters and the telephone companies.

The reason is the same for both of them. They've got a good thing going. It's either a video monopoly, or it's the only wire into the home, and they don't want somebody coming along and busting that up. They can be expected to continue to put roadblocks in the path of cable television. On broadcast issues, it's important that you recognize that we will never get from here to there. We will never get to the promise of our working together if we don't have a retransmission broadcast base to build upon, because the economic nut in building a cable system is built around retransmitted broadcast signals, and any efforts that are taken to try and limit our capability to do that will limit our capability to grow, will limit our capability to build, and will thereby snuff out the potential that you have for using us as a local distribution method.

On the telephone issue, you've got to remember that Ma Bell is not exactly a benevolent dictator. She'll give you what she wants to give you on her timetable when she's good and ready to give it to you, and it just seems to me that we both benefit and the people benefit if there is a healthy tension between the established telephone monopolies and the upstart cable industry as to who's going to build what first and get services out to the consumers. That's when you benefit.

If you go back and you look at the history of the telephone company, the PBX is a classic example. Europe has had far more advanced PBX's than this country has had, because of the fact that it didn't fit into the telephone company's economic game plan to replace all the PBX's that were out there earning money for them right now, and it wasn't until competition was introduced that the telephone company began being responsive, really responsive to consumer needs. They didn't know what consumer marketing was, and I submit to you that those of us in this room are existing in the consumer marketplace, and we need to keep it that way. We need to keep that healthy tension as to who's going to offer what.

These issues are being continually addressed at the Congress and the FCC, and the future of our ability to work together will be determined by what those public policy bodies do, so I would suggest to you that it might be worth your while to take a look at taking a position on some of the issues that will determine whether or not cable is going to grow, or, at least, how fast cable is going to get from here to there so that you have something to use.

So what are we talking about? We're two ditchdiggers with a dream, how to use the satellite for public service and how to overcome the programming limitations resulting from technological limitations in such a spectrum. Neither of us knows exactly how this ditch is going to be finished or what its impact is going to be, but we all know we've got to try. Now, I believe the key is a fuller understanding of each other. What I've tried to do was to lay out how we perceive ourselves. We've got a lot to learn about you, and I want to pledge to you today our efforts to do that.

I want to pledge to you today that, for instance, we will have at our convention in Dallas a panel to try and help cable operators learn about what you're doing and what and how we can all interrelate, and I'm going to be relying heavily on Liz Young to make that possible.

I guess I'd like to close on a note of caution and a note of optimism. The caution is that cable is trying to get, as I say, from here to there. The road is rocky. There are entrenched interests who don't want their nice little game spoiled. There are social engineers who want us to stop and study or else who want to create the world in their image. There is a governmental tendency to fit us into pre-existing regulatory cubbyholes where we don't belong and to say, "You are a common carrier, because you have a wire," or, "You are a broadcaster because you carry video programming," when we are neither.

I also needn't tell you about something that's on the front page of the paper every morning, and that's the impact of the coming recession on the cable industry which is going to be a real thing to take into consideration. That's the caution. I really think though we have a lot more to be optimistic about, and, as I was writing down the last couple of thoughts here, I looked on my wall, and there is a Carita print on my wall in my office that quotes Shakespeare, and I suddenly realized, hey, this is it, this is what I'm trying to say, because she quotes Shakespeare as saying, "We know not what we are, but what we may be," and I think that's where we are. We've got an idea of what we may be.

I had the privilege 15 years ago, a long time too, to spend some time working in the Andes of Equador and met a man who a pretty dynamic national leader, and he told me a story I never forgot which I think is indicative to what we're talking about here today. He told me a story about the man who built the Chicago Loop in the midst of the slums, and you'll recall the Loop was in the worst part of Chicago until a dreamer,

a visionary came along, and he said, "Here I'm going to build a masterplan for a great miracle mile for a great, thriving key part of this city," and he unveiled his plan, and they said, "You're crazy. It can't be done," and he said, "Make no small plans for small plans excite no great minds," and I really think that's where we all are today. It's going to be no small chore for either of us to get from here to there particularly when we really don't know where there is, but we shouldn't make any small plans, because we are all ditchdiggers, and if we keep throwing the dirt back over our shovel, soon enough something's going to happen around us whether we like it or not.

I believe in the resiliency of the American economy, and I believe in the resiliency of its people, that they'll figure out how to use us. I look forward to our continued working together and to the real possibility that we have to help each other make it in providing meaningful public service to the folks out there who pay the bills.

Thank you.

(Applause.)

Remarks
By

Dr. Elizabeth Young
President
Public Service Satellite Consortium

Fourth Annual Conference
Public Service Satellite Consortium

I think we all want to thank Tom for a most inspiring an upbeat ending to the formal part of our conference. Before we adjourn for the membership meeting which will begin at 2:15, I'd like to say thank you to the staff of PSSC who helped make all of this possible, and especially to Polly Rash who's been so efficient in handling all of the arrangements here and all of the details, many of which I don't know about, so thank you very much, Polly.

(Applause.)